

***RELEASE L***

**FOR THE  
ORIGINAL KEYBOARD**

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## CONTENTS OF THIS MANUAL

This manual presents the new software for Release L for the original Synclavier (R) II keyboard. In it you will also find information on the hardware requirements for Release L and instructions for installing the software onto your Winchester disk.

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OVERVIEW OF RELEASE L



## INSTALLING BUTTON PANEL OVERLAY

With Release L, some of the buttons on the keyboard button panel have been activated; others have different uses.

Included with the Release L software is a button panel overlay, which should be affixed to the lower half of the third button panel. This is the section of the button panel labeled "REAL TIME EFFECTS".

To install the overlay:

1. Clean the panel with an ammonia-based cleaner such as window cleaner.

Do not spray the cleaner directly on the panel. If you are using a spray cleaner, direct the spray onto a clean, soft cloth or paper towel, then use the cloth or towel to wipe the panel. Allow the panel to dry.

2. Without removing the overlay backing, place the overlay on the panel. The button panel screws should line up with the notches on the edges of the overlay.
3. Remove the backing from the overlay. This will expose the adhesive surface of the overlay.
4. Carefully place the overlay on the button panel. Beginning with the bottom edge, begin pressing the overlay gently onto the button panel, making sure that the notches line up with the bottom screws of the button panel.
5. When the overlay is in place, rub the entire surface of the overlay firmly to insure a secure bond. Pay particular attention to the edges of the overlay.

NOTE: Once you have installed Release L software, your REAL-TIME EFFECTS buttons will function only as described on the following pages. Previous methods for obtaining real-time effects will no longer work.



### NEW SOFTWARE FEATURES

Release L for the original Synclavier (R) II keyboard combines many of the features previously released to customers with the Velocity/Pressure Sensitive keyboard along with the latest developments in Synclavier (R) software.

The new software integrates the Real-Time Performance system with the computer terminal. It is a large program, requiring 60K internal memory and at least 256K external memory. The group of software modules includes several interchangeable Real-Time programs, one for each different configuration of hardware.

The major features of Release L for the original Synclavier (R) II keyboard are described on the following pages.



## MIDI

MIDI (Musical Instrument Digital Interface) makes it possible to incorporate the Synclavier (R) II into a network of synthesizers, rhythm machines, sequencers and other types of audio processing equipment. With the MIDI option, you can use the Synclavier (R) II keyboard to play back performances recorded on other sequencers. Or you can use another MIDI keyboard to play timbres created on the Synclavier (R) II.

You can install up to four MIDI modules in the Synclavier (R) II system. Since each module can have eight MIDI OUT ports and each MIDI OUT port can communicate to 16 separate MIDI channels, the Synclavier (R) II MIDI option makes it possible to layer up to 512 voices.

Instructions for installing the MIDI hardware and controlling MIDI from the keyboard are in this manual. The manual "The MIDI Option" is included with Release L software and includes instructions on the use of MIDI option.

## Real-Time Effects

With Release L, real-time effects can be produced from the original Synclavier (R) II keyboard through MIDI. The software converts the sixteen buttons under REAL-TIME EFFECTS (in the lower half of the third panel on the keyboard control panel) to control the following real-time effects:

- keyboard velocity
- keyboard pressure
- two foot pedals
- mod wheel
- pitch bend wheel
- ribbon controller
- keyboard control voltage
- breath controller

Keyboard velocity and pressure response, the mod wheel, the pitch bend wheel, the ribbon controller and breath controller are all controlled from the Synclavier (R) II keyboard through MIDI to a MIDI synthesizer or sequencer.

Though the original keyboard has only 61 notes, Release L software transmits up to 85 notes and receives 127 notes. This allows the use of full keyboard MIDI controllers with the Synclavier (R) II.

Instructions for setting up real-time effects are in this update.

### Improvements in Timing and Rhythmic Accuracy

The timing and note playback in the recorder and in external synchronization have been improved. The maximum triggering error for both internal and external sync modes has been reduced to 5 milliseconds, with a further reduction to 0 milliseconds if the sync delay feature is in use. There is also refined control of track sliding. These rhythmic improvements will affect sequences recorded with earlier software and played back with Release L.

Release L synthesizes timbres with greater precision than before. This will cause certain timbres developed with earlier software releases to sound crisper and more accurate. Some timbres created with previous software may have to be modified slightly to achieve the desired sound.

### External Synchronization Enhancements

With Release L, a new EXTERNAL RETRIGGER function causes each trigger pulse received into the EXTERNAL CLOCK IN jack to retrigger the most recent keyboard note or chord which can then be recorded onto tape or into the memory recorder. This feature makes possible

- a greatly simplified method for live drum replacement;
- using an external pulse to trigger the repeat/arpeggiate function;
- transferring a live click track from tape into the memory recorder.

In addition, a new sync delay feature has been added to the EXTERNAL BEAT SYNC function, and MIDI and SMPTE sync options are available.

### Terminal Interaction

When you activate the Release L Real-Time Performance system, the terminal will be active as well as the keyboard. You choose different displays from a menu on the computer terminal. These displays allow you to create, access and modify sound files, recall and modify timbres and sequences, or change catalogs.

If you are recording a sequence in the memory recorder, for example, the Recorder Display will show the notes of the sequence in computer music format or the Music Notation Display will show the notes in standard notation. If you are building a synthesized timbre, one of five Timbre Displays will show the parameters of the timbre. When you create a keyboard patch, you will enter the sound files on a PATCH Display.

Instructions for using the real-time terminal displays are in this manual.

### New Keyboard Features

- The transpose feature has been improved so that transposed keyboard patches access different sound files rather than transposing the assigned sound files.
- There is volume muting with the fast forward and rewind functions.
- There is no limitation on the double START function.
- Using the control knob with the KEYBOARD ENVELOPE feature, you can access up to 85 notes.

### Music Printing

Revision D.3 updates the Music Printing software for compatibility with Release L. New commands and editing features provide improved editing capabilities while the new Symbol Editor is a drawing tool for custom music printing symbols.

The new Music Printing features have been incorporated into the revised Music Printing Reference Manual.



## System Support Software

The Monitor, Utility programs, Diagnostic programs and the installation process have all been improved.

### Monitor

The revised Monitor provides significant improvements to the XPL compiler as well as new commands and storage structure features. Following is a summary of the new Monitor features:

- There is a new SET command which can be used with modifiers to change values of certain aspects of either the system software or your current file. For each SET command there is a corresponding SHOW command that displays the value that has been "set."
- The new REV command activates the SCRIPT Reverse Compiler directly from the Monitor.
- A DRENAME command allows you to change the name of any file stored in the current catalog.
- Storage devices have now been integrated into the catalog structure. You can change your current device, enter subcatalogs in remote devices, store and recall files to and from any catalog on any device. A new CREATE command replaces the CREATE CATALOG (CCA) and the CREATE LARGE CATALOG (CLC) commands.
- On-Line Documentation
- A new HELPTXT provides on-line HELP screens.

The new Monitor is fully documented in the manual, "Using the Monitor."

### Utility Programs

The existing Utility programs have all been improved while several new ones have been added. The manual "Using the Utility Programs" is included with Release L documentation.

## New Computer Diagnostics

Diagnostics software should only be run under the advice and direction of a New England Digital customer service technician.

### For Superfloppy (1.2 Meg) Disk Drives

Release L Diagnostics come on three superfloppy disks, each of which can boot the system. Place one in the FO drive and press the LOAD button.

1. Boot the system from the System Utilities Disk when you want to bypass the Winchester and run one of the utility programs. When you press the LOAD button, the Monitor "Ready>" prompt appears on the screen.
2. Boot the system with the System Diagnostic Disk when you want to run hardware tests on keyboard, memory, printer, floppy or tape drives, or multichannel and MIDI outputs. When you press the LOAD button, a menu appears on the screen.
3. Boot the system with the Audio System Diagnostic Disk when you want to test your FM voices. When you press the LOAD button on the floppy drive, a special RTP version is run.

### For Double-Density Disk Drives

Release L Diagnostics come on four double-density disks, two of which can boot the system. Place one in the FO drive and press the LOAD button.

1. Boot the system from the System Disk when you want to bypass the Winchester and run one of the utility or diagnostic programs. When you press the LOAD button, the Monitor "Ready>" prompt appears on the screen.
2. Boot the system with the Audio System Diagnostic Disk when you want to test your FM voices. When you press the LOAD button, a special RTP version is run.
3. Once the system is booted, use the Utility Programs Disk to run any of the Utility programs.
4. Once the system is booted, use the Diagnostic Programs Disk to run hardware tests on keyboard, memory, printer, floppy or tape drives, or multichannel and MIDI outputs.

Instructions for using the new Utility programs are in the manual, "Using the Utility Programs." Instructions for using the hardware diagnostic tools are in the manual "Troubleshooting the Original Synclavier (R) II" included with Release L documentation.

## HARDWARE

### Minimum Hardware Requirements

#### Memory

Release L software requires two M32K memory boards plus at least two M128K external memory cards. Additional M128K cards will provide more memory for recording sequences, editing sound files, etc.

#### Keyboard

Release L supports both the Velocity/Pressure Sensitive keyboard and the original Synclavier (R) II keyboard. Certain options work somewhat differently on the original keyboard.

#### Drive System

The minimum drive configuration for users with the Sample-to-Disk (R) option is a Winchester connected to WINCHESTER 0 and a floppy drive (either double density or superfloppy) connected to FLOPPY DRIVE 0.

The minimum configuration for users without Sample-to-Disk (R) is a single superfloppy drive connected to FLOPPY DRIVE 0. It will be more useful for users without Winchesters, however, to have two superfloppy drives with the second one connected to FLOPPY DRIVE 1.

The superfloppy drives can read and write to the old double density diskettes. They cannot format them nor can they read or write to single density diskettes.

#### Terminal

Release L software can be run with a non-graphics terminal, or even without a terminal. However, a graphics terminal is required for full use of the terminal display features.

Automatic wrap-around and newline features of the terminal must be set to OFF.



## Hardware Options

### MIDI

You can install up to four MIDI units in the Control Unit. Each unit consists of a MIDI module and one or two MI70 boards. A module with one MI70 board has only four outputs active; one with two MI70 boards has eight outputs active.

### SCSI Winchester Drives

The newly available SCSI Winchester drive has far greater storage capacity than IMI Winchesters. It is operated from a D24 board with a SCSI host adapter through the WINCHESTER 0 connector on the Control Unit.

You can add a single SCSI Winchester to a system with IMI Winchesters. Or you can have as many as eight SCSI Winchesters attached to your system.

### Monterey MG600 (Pericom) Terminal

The Monterey MG600 (Pericom) terminal is a high-speed graphics terminal with a 14-inch non-flicker screen, improved ergonomic design, higher resolution screen, and programmable function keys for commonly used commands.

### High Speed Processor and D16 Timer

The D16 Scientific Timer shortens the average delay occurring in external synchronization to approximately 1.5 milliseconds with a variation of only plus or minus 0.5 seconds.

The High Speed Processor replaces the old processor board.

Both boards improve timing, keyboard performance and fidelity of complex resynthesized timbres.

### Clock Interface Module

The Clock Interface Module (CIM-1) encodes digital pulses or live audio signals into FSK signals reproducible on tape. It converts audio signals into Synclavier (R) II compatible trigger pulses for external synchronization. It also contains a pulse divider which divides high speed clock signals for use with the Synclavier (R) II.

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\* SCSI stands for Small Computer Systems Interface, an industry standard system for connecting computer peripheral equipment.



## SOFTWARE INSTALLATION PROCEDURE

### Installing Release L Onto Your Winchester Disk

The Release L software is contained on several floppy diskettes. One of these diskettes, labeled "Release L Installation Diskette," contains the program that will install all Release L software onto your Winchester disk.

When you insert this diskette into FLOPPY DRIVE 0 and press the LOAD button, the installation program will begin to run.

You will first be asked whether you want to format your Winchester disk. Formatting erases all information stored on the Winchester disk. When installing new software, it is recommended that you select this option, erasing unwanted files and recovering contiguous disk space. Make sure that all your sound files, sequences and timbres are backed up on floppy diskette or tape. Otherwise, you should skip this step.

You will be asked some questions about the options on your system and then the program will step you through an orderly installation of the Release L files. These include the Real-Time Performance software for both the keyboard and the guitar, the HELPTXT file and several of the Utilities programs. Music Printing will also be installed if you indicate that you have this option.

If you do not already have a profile file,\* the installation program will install a factory pre-set one. This profile file will include in it the PLAY command so that the Real-Time system will come up directly when you press the LOAD button.

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\* A profile file is a special file that gives the Monitor a series of commands whenever the LOAD button is pressed. Complete information on the profile file is in the new "Using the Monitor."

## RTP Software Versions

The installation program installs several versions of the RTP, each one for a specific configuration of hardware. Each version has its own filename:

---

NAME	HARDWARE CONFIGURATION
ORK-LM	Original Synclavier (R) II keyboard; Sample-to-Disk (R).
ORK-LGTR	Original Synclavier (R) II keyboard; Sample-to-Disk (R); Digital Guitar Interface.
ORK-LFM	Original Synclavier (R) II keyboard.
ORK-LGFM	Original Synclavier (R) II keyboard; Digital Guitar Interface.

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The RTP version, ORK-LMXX appears on the Audio System Diagnostic Disk. It is special version of the Real-Time Performance program which allows you to test FM voices. Diagnostic programs should only be used under the guidance of a New England Digital Customer Service technician.

There is also an additional RTP version, ORK-IMB, available. This version has more memory allocated for attack buffers\* and may be preferred when you are creating keyboard patches. Fewer notes will be available on the memory recorder, however, and several of the terminal displays will be inactive.

If you want this RTP version, call N.E.D. Customer Service.

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\* Attack buffers are used in monophonic systems to store the beginning of each sound file assigned to a keyboard patch. When you press a key, the sample from the attack buffer sounds while the computer searches for the sound file on the Winchester disk. By the time the sample in the attack buffer is finished playing, the sound file will have been located and the rest of it can be read from the disk. See "Creating a Keyboard Patch" in this update.

### Changing the Default RTP Version

The installation program automatically installs ORK-IM as the default RTP version.

You can temporarily change the default RTP version at any time in the following way:

1. Press the BREAK key to enter the Monitor.
2. Type

SET RTP <RTP version name>

3. To activate the new RTP version, type

PLAY

If the designated RTP version is not on your Winchester disk, an error message will appear.

The SET RTP command makes only a temporary change in the default RTP version. If the system is turned off and on again, the original default version will come up.

If you want to change the RTP version more permanently, you can do so by changing the SET RTP command in your profile file. To do this press the BREAK key to return to the Monitor and type

HELP PROFILE

Or look in the new "Using the Monitor" under "The Profile File." Follow the instructions to change the SET RTP command in the profile file. When you have made the change, type

BOOT

to reinitialize the system. The RTP version that you set in the profile file will come up whenever you boot the system.



## Running Release L

To run Release L software,

1. Remove the Release L Installation diskette from FLOPPY DRIVE 0 after the installation is complete;
2. Insert the Release L Bootload diskette;
3. Press the LOAD button.

You will see the usual prompt

N.E.D. Able Series Monitor

followed by a Please Wait message. After a brief delay, the Release L WELCOME MENU will appear on the terminal screen.

NOTE: It is highly recommended that you use the Formcopy utility to make a backup copy of your Release L Bootload diskette.
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You can also run Release L from a superfloppy diskette, thus bypassing the Winchester disk altogether. Although computer performance may be somewhat slower, a Release L system diskette may be useful when on the road or in the event of a Winchester breakdown. Contact N.E.D. Customer Service if you would like a Release L system diskette.

## Reconfiguring Your System

You can use the Real-Time Performance System as soon as you have finished installing Release L software. However, if you have hardware options beyond the minimum requirements, such as a printer interface, a tape drive interface or additional drives, you should run the CONFIGUR program to make sure that your system is configured for the correct terminal, amount of memory, drive system, etc.

To do this,

1. press the BREAK key to return to the Monitor;
2. type

OLD CONFIGUR; RUN

Instructions for using the new CONFIGUR program are in the new "Using the Utility Programs" that accompanies this document.

### IMPORTANT

If you change any of the hardware in your system after you have installed Release L software, you must reconfigure your system by running the CONFIGUR utility.







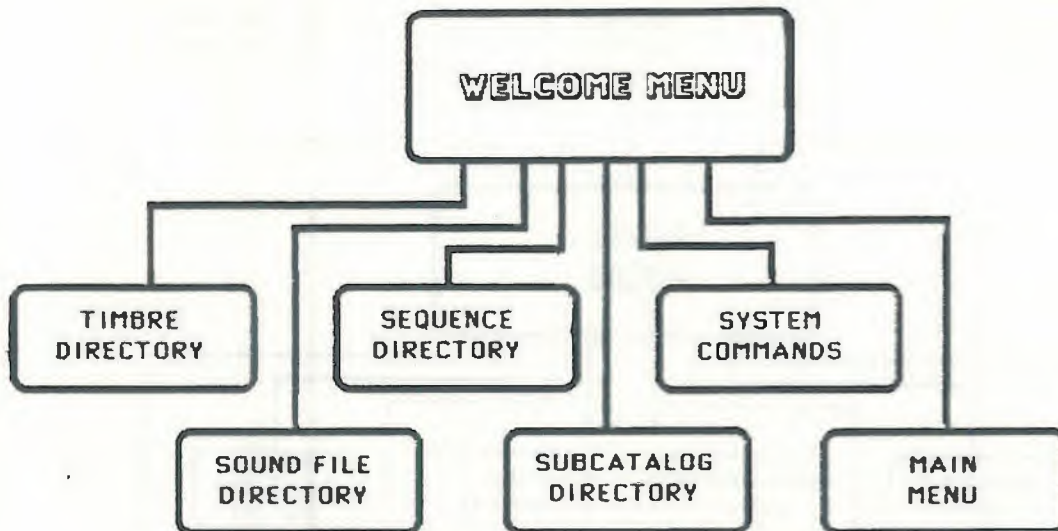
REAL-TIME TERMINAL DISPLAYS



## TERMINAL DISPLAY STRUCTURE

### The Welcome Menu

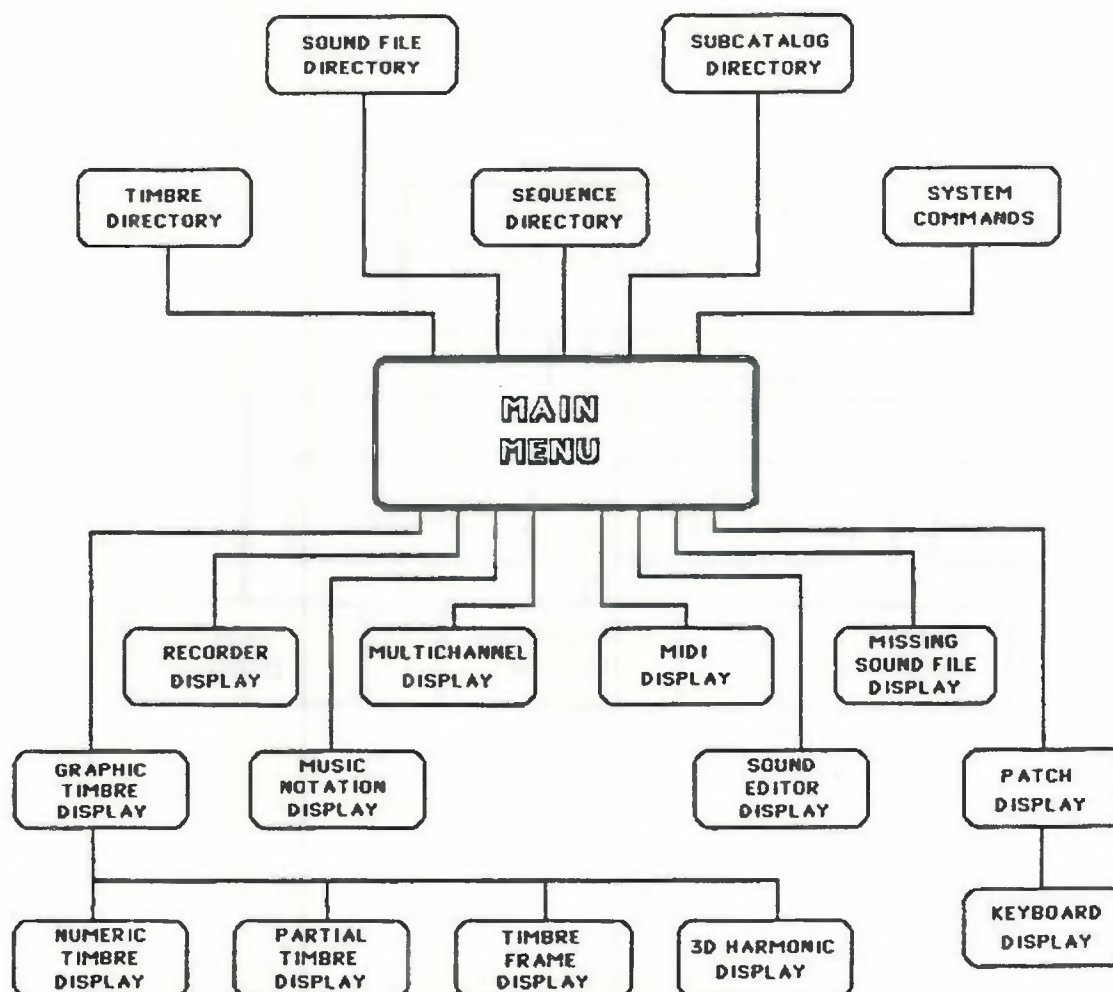
When you first load the system, the Welcome Menu appears on the terminal screen. It is the first level of the terminal display structure. From it you can access four directory displays, a System Command menu, and the Main Menu.



You can use any of the first five displays and then return to the WELCOME MENU. The sixth screen, the MAIN MENU, allows you to access a number of additional displays.

## The Main Menu

When you select the Main Menu, you cannot return to the Welcome Menu. The five displays available from the Welcome Menu can be called from the Main Menu. Eight additional displays are available, as shown below.



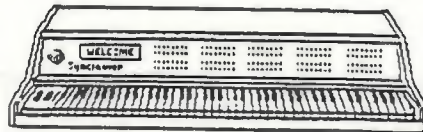
NOTE: Two of these displays, the Multichannel Distributor Display and the Sound Editor, are options not available with the original Synclavier (R) II keyboard.

## USING THE WELCOME MENU

The Welcome Menu contains a list of displays. To the left of the list is a selection arrow. To select a display, use the arrow keys on the terminal keyboard to move the selection arrow down or up. Once the desired screen is selected, press the <RETURN> key. The Welcome Menu will be replaced by the selected display.

### WELCOME TO THE SYNCLAVIER DIGITAL MUSIC SYSTEM

This software supports the following hardware options:  
\*Original Keyboard \* (Digital Guitar not available)  
\*Sample-to-Disk (R) Option



Select screen with arrow keys. Press <RETURN> to activate screen.

Now Selected ==> A. Timbre Directory  
B. Sound File Directory  
C. Sequence Directory  
D. Subcatalog Directory  
E. System Commands  
F. Main Menu

Release L (BETA TEST): 2/6/86

Current Timbre: "SINE WAVE"  
Current Catalog: W0:

You may also select from the Welcome Menu by typing the letter next to the menu selection.

To return to the Welcome Menu from any of the directories, press the <ENTER> key once (VT or Monterey/Pericom terminals) or the <ESC> key twice (ADM terminals).

## THE TIMBRE DIRECTORY

The Timbre Directory displays the names of the timbres stored in the timbre file in the current catalog.

A numbered list of available devices appears across the top of the screen. To change devices, type in the number next to the desired device. When you change devices, the timbre directory will change to reflect the timbre file available on the new device.

If the timbre file you want is in a subcatalog of a device, you will have to use the Subcatalog Directory to enter the subcatalog (see below).

Once you have the correct timbre file displayed, select a keyboard timbre by using the arrow keys to move the cursor until it is positioned over the desired timbre. Then press RETURN. You can also use the buttons under TIMBRE/SEQUENCE STORAGE on the keyboard button panel to recall the timbre.

The selected timbre will be placed onto the keyboard. The new timbre name will appear in the keyboard display window.

While the Timbre Directory is active, all timbres recalled or saved using the keyboard button panel will be read from or written to the directory displayed.

When done with the display, press <ENTER> to return to the Main or Welcome Menu.



### Sound File Directory

The Sound File Directory displays a list of all sound files stored on the current device.

A numbered list of available devices appears across the top of the screen. To change devices, type in the number next to the desired device.

When you change devices, the directory of sound files will change to reflect the sound files available on the new device. You can scroll through this directory using the arrow keys. If you type T, the sound file where the cursor is currently located will move to the top of the screen; if you type B, that sound file will move to the bottom of the screen.

When you have located the desired sound file, move the cursor until it is positioned over the desired sound file and then press <RETURN>. The selected sound file is placed on the keyboard as partial timbre #1. The other partial timbres will be empty.



## Sequence Directory

The Sequence Directory displays a list of sequences stored in the current catalog.

A numbered list of available devices appears across the top of the screen. To change devices, type in the number next to the desired device. When you change devices, the directory of sequences will change to reflect the sequences available on the new device. All sequences recalled or saved will be read from or written to the device displayed.

If the sequence you want to recall is stored in a subcatalog, you will have to use the Subcatalog Directory to enter that subcatalog (see below).

Sequences stored under the buttons on the keyboard control panel will be listed as <SEQ #1>, <SEQ #2> and so on. The directory will also include sequences stored under a filename; For example, sequences recalled to the Monitor module using the RECALL command or SCRIPT sequences compiled using the CONVERT command can be given a filename in the Monitor. These files appear on the Sequence Directory and can be recalled from the button panel or the terminal.

To recall a sequence from the terminal, move the cursor until it is positioned over the desired sequence and then press RETURN. The selected sequence will be placed into the memory recorder. You can also recall up to six of the eight numbered sequences using the RECORDER STORE/RECALL buttons on the keyboard button panel.

### Subcatalog Directory

The Subcatalog Directory contains a list of all devices and subcatalogs available from the current catalog.

To enter a device or subcatalog, move the cursor to the desired device or subcatalog and press <RETURN>.

You can also enter a subcatalog anywhere in your catalog structure by typing in its treename. A treename is a series of catalog or device names that moves you through the catalog structure to the desired subcatalog, which may be in another branch of the catalog structure or on another device. (See the new manual, "Using the Monitor" included with Release L documentation.)

## System Commands

The System Command screen contains a list of the command keys used to leave the Real-Time Performance module and enter another module.

COMMAND KEY	MODULE TO ENTER
<BREAK>	Monitor
<PF1> or <ESC> 1	Reverse Compiler
<PF3>	Music Printing
<PF4>	Signal File Manager

Other system commands available from this display provide the following functions:

### Return to Previous Screen

Returns you to the screen where you were before coming to the System Commands display.

### Change terminal beep mode: OFF

You can set up the terminal to emit a beep whenever an error is made. To do this, select the Beep Status item and press <RETURN> to change the status to ON. Press <RETURN> again to toggle the status to OFF.

### THE MAIN MENU

Once select the Main Menu from the Welcome Menu, you cannot return to the Welcome Menu (except by leaving and re-entering the Real-Time Performance system). All the displays available from the Welcome Menu are also available from the Main Menu.

The Main Menu selections access all of the displays available in the Real-Time Performance system. In addition to the displays described previously, you can access displays allowing you to

- view and modify synthesized timbres;
- create a keyboard patch from sound files;
- create and edit sequences in the memory recorder in either computer music notation or standard notation;
- make assignments for MIDI.

Following are brief descriptions of each display with references for further instructions.

### The Timbre Displays

The five Timbre Displays allow you to view and modify the parameters of any synthesized keyboard timbre. You will use these displays when you are designing or modifying timbres.

Instructions for using the Timbre Displays are in the section "The Timbre Displays."

### The Recorder Display

The Recorder Display allows you to view and edit notes in the memory recorder in computer music format. Instructions for using the Recorder Display are in the section "The Recorder Display."

### The Music Notation Display

The Music Notation Display allows the sequence in the memory recorder to be viewed in standard notation. Instructions for using the Music Notation Display are in the section "Music Notation Display."

### The PATCH Display

You use the PATCH Display to create a keyboard patch of sampled sounds and assign them to a partial timbre. Complete instructions for using the PATCH Display to create and modify a keyboard patch assigned to a partial timbre are in the section "Using Sampling and Synthesis."



## MIDI Display

When the Real-Time Performance software is first activated, all the MIDI OUT ports will be turned off. In order to send MIDI information either from the Synclavier (R) keyboard or memory recorder, you will need to turn the MIDI OUT ports on. You can designate routings of both the keyboard and the second timbre of a split keyboard as well as all 16 tracks of the memory recorder. Complete instructions for using the MIDI Display are in the manual, "The MIDI Option", included with Release L software.

## Missing Sound File Display

When a timbre that consists of one or more sound files is recalled to the keyboard, either directly from the Timbre Directory or as part of a sequence recalled from the Sequence Directory, all the sound files contained in the timbre must be stored on the Winchester or on the floppy diskette in one of the attached floppy drives.

If any of the sound files contained in the timbre are not stored on the Winchester or on the diskette in the floppy drive, the message

Error: Missing Sound File [Name]

will appear on the terminal screen.

To view a list of all the missing sound files, select the Missing Sound File Display from the MAIN MENU. You will then be able to load the missing sound files onto the Winchester by pressing <BREAK> to return to the Monitor and using the FORMCOPY utility.

## Name Keyboard Timbre

When you select this item from the Main Menu, the following instruction appears at the bottom left corner of the screen:

Enter New Timbre Name " "

Type in up to 16 characters and press RETURN. The changed name will replace the previous timbre name appearing at the lower left of the screen. When you store the keyboard timbre, the new name will be stored with it.

### Screen Print-Out

You can print out a hard copy of any screen in the Real-Time Terminal Displays. To do this, type

P

while the desired display is on the terminal screen.

Due to conflicts in existing command formats, you need to press <CTRL-P> instead of typing P in order to get a printout of the following screens:

- Subcatalog Directory
- Sound File Assignment "PATCH" Display

From the Timbre Display screens, you activate the screen print feature by selecting the HARDCOPY command from the menu on each of those displays.



### TIMBRE DISPLAYS

The five Timbre Display screens allow you to view and modify the parameters of any synthesized keyboard timbre. They include the following:

- Graphic Display
- Numeric Timbre Display
- Partial Timbre Display
- Timbre Frame Display
- 3D Harmonic Display

All five can be accessed from a graphics terminal; only the Numeric Timbre Display and Timbre Frame Displays can be accessed from a non-graphics terminal.

Beneath the title in all five screens are the name and identification numbers (library, bank and entry) of the keyboard timbre. At the bottom of graphic screens and at the top of the numeric screens is a menu which allows you to move to the other screens or produce hardcopy. Select from this menu by using the arrow keys to move the cursor to the desired selection and pressing <RETURN>.

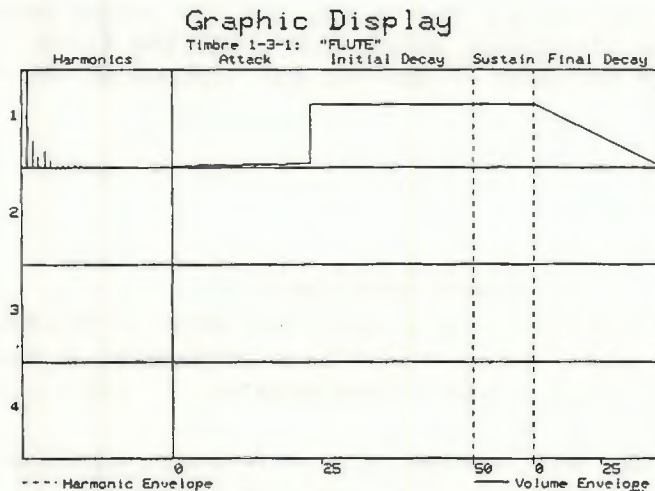
You will use these displays when you are designing or modifying timbres.

From any screen, you can return to the Main Menu by pressing <ENTER> (graphics terminals) or <ESC><ESC> (non-graphics terminals).



## GRAPHIC DISPLAY

If you have a graphics terminal, the first Timbre Display screen is a complete graphic display of the active keyboard timbre. It allows you to view in graphic form the parameters of each partial timbre, modify these parameters using the keyboard unit buttons and control knob, and print a hardcopy of the display.



The main part of the screen is divided horizontally into separate graph areas for each partial timbre and vertically into sections for harmonic coefficient, attack and initial decay, sustain, and final decay graphs.

The harmonic coefficients present in each partial timbre are presented at the left on a scale of 0-100% volume.

Volume envelope (solid line) and harmonic envelope or frequency modulation (dotted line) values are shown at the center and right. The vertical scale is again 0-100% volume. Changes over time can be observed by reference to the time scale in milliseconds at the bottom. Since the sustain parameters remain the same no matter how long a note is held, they have no time scale.

When values are changed by using the buttons and control knob, the effect will be immediately reflected by changes in the lines on the terminal graphic display, in the values shown in the keyboard display window, and in the sound of the keyboard timbre.

## NUMERIC TIMBRE DISPLAY

If you have a non-graphics terminal, the Numeric Timbre Display will be the first screen to appear when you select Timbre Display from the Main Menu. It presents the exact numeric values for timbre parameters and allows you to change them by entering new ones from the terminal as well as by manipulating the keyboard buttons and control knob.

Across the middle of screen are the values for the volume envelope, the harmonic envelope (frequency modulation), and the first 12 harmonic coefficients for each of the partial timbres of the current keyboard timbre.

```
-NUMERIC TIMBRE DISPLAY-
Press arrow key to move cursor and enter value. Press (ENTER) for Main Menu.
Select Display ==> Graphic Numeric Partial Timbre Timbre Frame 3D Hardcopy
----- Timbre: 1-8-2: "SPACE VOICES (S)" -----

- Delay Attck IDec FDec Peak Sust -- 1st 12 Harmonic Coefficients ---
1. V 0 504 0 1892 100.0 100.0 100.0 88.1 99.7 6.8 3.1 6.3
   H 0 0 0 0 0 0 6.5 4.0 1.7 0.3 0.1 0.2

2. V 6 504 0 1892 100.0 100.0 100.0 88.1 99.7 6.8 3.1 6.3
   H 0 0 0 0 0 0 6.5 4.0 1.7 0.3 0.1 0.2

3. V 6 504 0 1892 100.0 100.0 100.0 88.1 99.7 6.8 3.1 6.3
   H 0 0 0 0 0 0 6.5 4.0 1.7 0.3 0.1 0.2

4. V 19 504 0 1892 100.0 100.0 100.0 88.1 99.7 6.8 3.1 6.3
   H 0 0 0 0 0 0 6.5 4.0 1.7 0.3 0.1 0.2
```

The numbers 1, 2, 3, and 4 along the left edge of this portion of the screen represent the four partial timbres. Each partial timbre number is followed by the letters V, for volume envelope, and directly below that, H, for harmonic envelope. These letters are followed by the values for the delay, attack, initial decay, final decay, peak and sustain for each envelope.

To the right of these values are the values of the first 12 harmonic coefficients. You can use the HARMONIC SELECT button in the first panel of the keyboard unit or the space bar on the terminal to toggle between the Harmonics 1-12 and Harmonics 13-24.



Across the bottom of the screen are the values for any special effects which may be programmed into each partial timbre.

```

----- Partial -----      ----- Vibrato -----      --- Stereo ---
Tuning Volume FM Rat Chorus Wave Rate  Depth MDep  Attk IQB Wave Rate Dep Pan
1.  439.7:100.0: 1.000: 1.000:Tri: 5.95: 0.14: 0.00: 722: 0 10.00: 0:-13
2.  438.2:100.0: 1.000: 1.000:Tri: 5.86: 0.06: 0.00: 722: 0 10.00: 0: 10
3.  437.1:100.0: 1.000: 1.000:Tri: 5.76: 0.13: 0.00: 722: 0 10.00: 0:-21
4.  442.1:100.0: 1.000: 1.000:Tri: 6.01: 0.06: 0.00: 722: 0 10.00: 0: 9

```

Again, the numbers 1, 2, 3, and 4 along the left edge of this portion of the screen represent the four partial timbres. Each partial timbre number is followed by values for partial tuning, partial volume, FM ratio and chorus; vibrato wave, rate, depth, modulation depth, attack and the invert, quantize and bias vibrato functions; and stereo wave, rate, depth and pan.

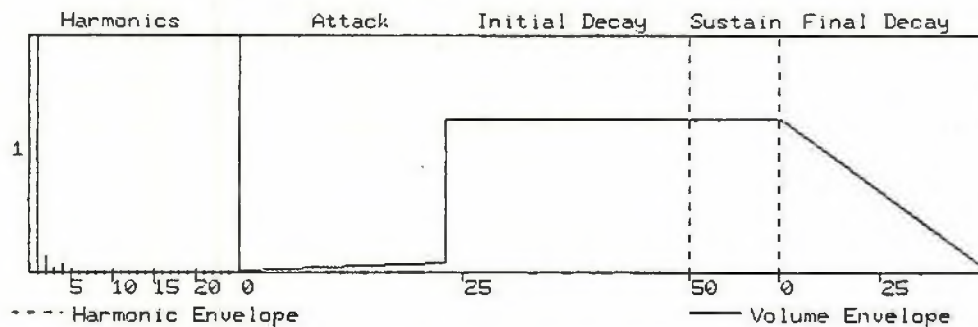
To change the value of any numeric parameter, move the cursor to the parameter value using either the terminal cursor arrows or the appropriate button on the keyboard unit. The new value may be entered either by using the control knob on the keyboard unit or by typing it in at the terminal. The invert, quantize and bias vibrato functions are changed in the same way with the keyboard control knob or from the terminal by moving the cursor directly below I, Q, or B on the line of the selected partial timbre and toggling each on or off with the space bar. The vibrato wave form can be changed only by the keyboard controls. Change in any value will be reflected in the terminal display, the display window of the keyboard unit and in the timbre sound itself.

## PARTIAL TIMBRE DISPLAY

The Partial Timbre Display is a large scale graphic presentation of the information for any one partial timbre from the Graphic Display. It also includes alphanumeric values for all of the other settings for that partial timbre. The graphic area may have different time scaling from that shown on the Graphic Display.

### Partial Timbre Display

Timbre 1-3-1: "FLUTE"



Timbre Frames:	13	Vib Wave:	Tri	Stereo Wave:	10	Port On/Off:	Off
Partial Tuning:	440.0	Vib Rate:	5.23	Stereo Rate:	0.00	Port Mode:	Lin
Random Pitch:	0.00	Vib Depth:	0.13	Stereo Depth:	0	Port Rate:	0.000
Partial Volume:	100.0	Mod Depth:	0.00	Stereo Pan:	0		
FM Ratio:	1.000	Attack:	31				
Partial Chorus:	1.000	Invert:	Off				
		Quantize:	Off				
		Bias:	Off				

Changes made using either the keyboard buttons or control knob will be immediately apparent on the terminal screen, in the keyboard display window, and in the sound of that partial timbre.



## TIMBRE FRAME DISPLAY

The Timbre Frame Display allows you to look at the profile of each timbre frame and make adjustments with either the terminal or keyboard unit.

-TIMBRE FRAME DISPLAY-

Partial Timbre 1 of 1-3-1: "FLUTE"

Press arrow key to move cursor and enter value. Press (ENTER) for Main Menu.

Select Display ==> Graphic Numeric Partial Timbre Timbre Frame 3D Hardcopy

---

Frame	Splice Delay	Splice Time	Splice Shape	Peak Level	Pitch Offset	Harmonic Coefficients ( 1-12)						
0	0	23	0	3.5	0.00	100.0	6.5	1.9	3.3	1.0	0.1	0.3
1	0	9	0	7.6	0.00	100.0	4.9	0.4	3.2	0.1	0.2	0.2
2	0	11	0	18.3	0.00	100.0	6.7	1.0	1.1	0.6	0.2	0.2
3	0	16	0	45.7	0.00	100.0	15.1	2.0	2.2	0.5	0.1	0.1
4	0	17	0	71.2	0.00	100.0	12.0	1.1	1.3	0.6	0.1	0.1

---

Numbers on the left identify values across the screen for the first five timbre frames. To bring up additional frames move the cursor down with the terminal arrow key. Or hold down the appropriate PARTIAL TIMBRE SELECT button on the keyboard unit and turn the control knob as explained in the tabbed section "Timbre Design" in Binder 1.

You can change a value in the usual way with the keyboard buttons and control knob. Or you can move the cursor to that value and type in new values from the terminal.

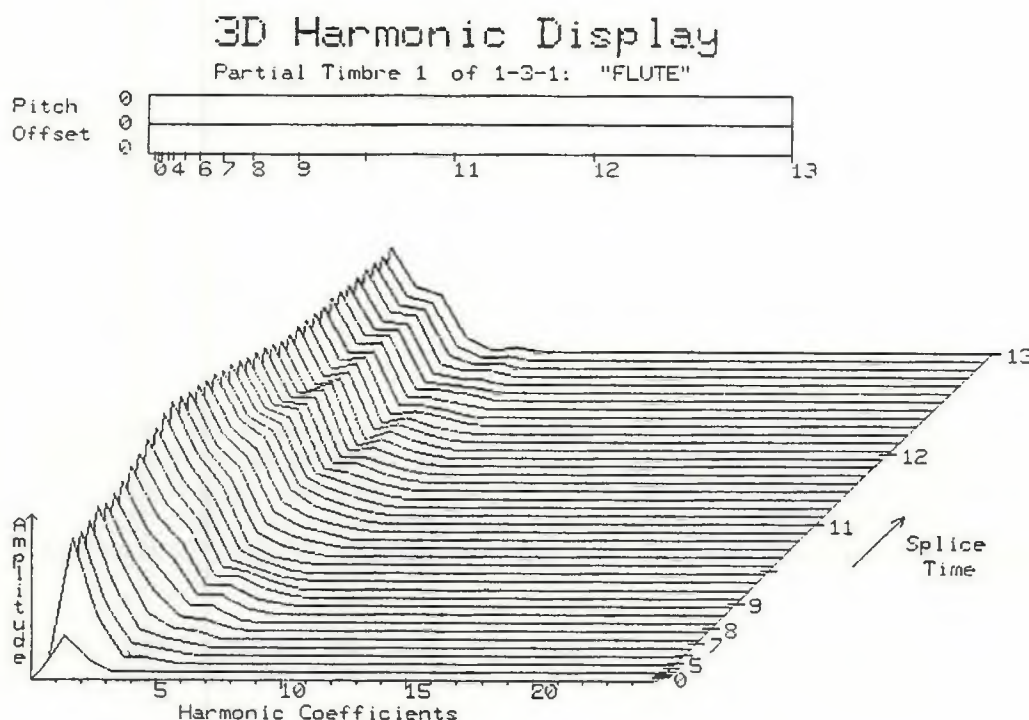
### 3D HARMONIC DISPLAY

The 3D Harmonic Display is a graphic presentation of the development of a changing partial timbre through all of its timbre frames. The main graph plots the relative volume of the 24 harmonic coefficients (numbered at the bottom) on a 0-100% scale. The "third dimensional axis" shows changes from frame to frame over time. That is, each succeeding plotted line beginning above the bottom scale shows the volume of all 24 harmonics at the next point in time.

Each additional line drawn above and slightly to the right shows similar data a constant amount of time later. Timbre frames, numbered on the right, are shown in proportion to their length. Thus, the harmonics of several very short ones may be shown by a single line while the harmonics of longer frames may be represented by several lines. The time span shown, proceeding up and right on the graph, is the total of splice times or lengths of all timbre frames. It may range from milliseconds to minutes.

A smaller graph at the top of the screen plots the pitch offset of each timbre frame using the maximum offset of any frame as the scale maximum. See the tabbed section "Timbre Design" in Binder 1.

When new values are entered at the keyboard, the display will be automatically redrawn to reflect these changes.



## MUSIC NOTATION DISPLAY

The Music Notation Display is a window into sequence data which allows you to view the sequence in standard music notation.

After setting a number of menu parameters to tell the computer how to display the sequence accurately, you use commands shown on the screen to enter music and edit it much as you would on paper. These commands allow you to justify notes which have been recorded slightly out of time, move notes, change their duration and pitch, or erase and add new notes.

### WARNING

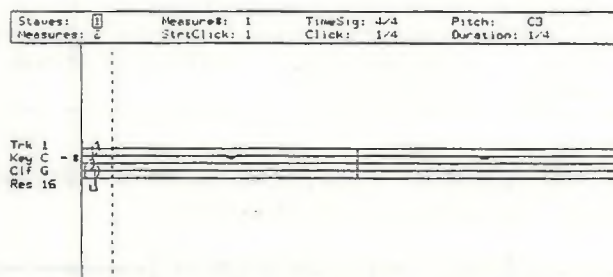
In order that the computer can devote its full attention to playing a sequence correctly, using the Music Notation Display should be avoided while performing any critical timing functions.



## VIEWING THE MUSIC NOTATION DISPLAY

The Music Notation Display screen is activated from the MAIN MENU.

MUSIC NOTATION DISPLAY	
1. Use arrow keys to move cursor around menus and music.	
2. Enter values to achieve desired display.	
3. Use the following special keys:	
<CTRL-X> remove or restore these instructions.	
<TAB> move between menu and music. <SPACE> toggle values	
<CTRL-P> start,      <CTRL-E> stop,      <CTRL-C> continue.	
<CTRL-R> rewind,      <CTRL-F> F.F.	



The screen is divided into three areas:

- Instruction area at the top,
- Menu area in the center and down the lower left margin,
- Notation area at the bottom.

Use <TAB> or the arrow keys to move the cursor between the menu area and the notation area.



## The Instruction Area

The instructions in the instruction area change depending on whether the cursor is located in the menu area or in the notation area.

While the cursor is in the menu area, general instructions are shown for moving around the screen, setting menu values, and operating the memory recorder.

— MUSIC NOTATION DISPLAY —

1. Use arrow keys to move cursor around menus and music.
2. Enter values to achieve desired display.
3. Use the following special keys:
  - <CTRL-X> remove or restore these instructions.
  - <TAB> move between menu and music, <SPACE> toggle values
  - <CTRL-P> start, <CTRL-E> stop, <CTRL-C> continue.
  - <CTRL-R> rewind, <CTRL-F> F.F.

When the cursor is in the notation area, the general instructions are replaced by instructions for editing the notation.

| MUSIC NOTATION DISPLAY |

Move cursor with arrow keys. Toggle instructions with <CTRL-X>.

/ Set duration: type 1,2,4,8,6(16th),3(32nd),<DOT> or set menu.

Add Set accidental (if needed): Q - sharp S - natural, Z - flat.

Note Enter note with pitch (A - G) or set pitch with menu.

\ Add note to chord - <SHIFT> pitch (A - G). Add note - <SPACE>.

Delete note - <DEL> Lengthen note - ] Pitch up - P Note later - )

Justify note - J Shorten note - [ Pitch down - ; Note sooner - [

The instruction area disappears altogether if you choose to show more than three staves in the notation area. It can be brought back when needed by pressing <CTRL-X>.

## The Menu Area

The menu area includes the box immediately below the instruction area plus five items in the left margin for each staff shown in the notation area. You press <TAB> to move the cursor from the notation area to the menu area.

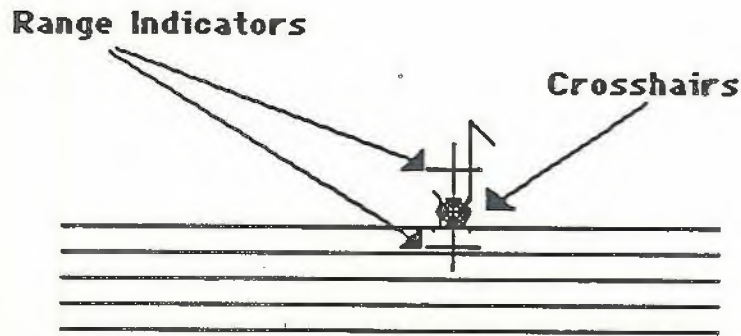
Staves: 1	Measure#: 1	TimeSig: 4/4	Pitch: C3
Measures: 2	StrtClick: 1	Click: 1/4	Duration: 1/4

Trk 1  
Key C - #  
Clf G  
Res 16

While in the menu area, the cursor is a small rectangle around a selected value. It can be moved with the arrow keys. The values within its rectangle can be set by typing them in or, in some cases, by toggling the desired value by pressing the <SPACEBAR>.

### The Notation Area

The notation area, located in the lower part of the screen, includes one to eight staves as selected from the menu area. You press <TAB> to move the cursor from the menu area to the notation area.



While in the notation area, the cursor is a vertical line with two horizontal lines, or range indicators, encompassing the octave in which editing is to be done. Within its range indicators, notes can be added, deleted, or changed.

The right and left arrow keys move the cursor forward and backward. The up and down arrow keys move the range indicators up and down on each staff. They also move the cursor from staff to staff.

As you play the sequence, a vertical dotted line in the notation area moves from left to right indicating the notes being played. This is the song position pointer, which is the current click number and the current position of the memory recorder. If you press CONTINUE the memory recorder starts at the song position pointer location.

When the song position pointer reaches the end of the line, the next group of measures is displayed and the dotted line again traces the notes across the screen as they are played. You can edit at any point by stopping the memory recorder.

### Moving the Cursor in the Notation Area

If you move the cursor beyond the end of a staff, the screen scrolls ahead one measure and the cursor appears on the last resolution block of the new measure. (If the resolution is 16, for example, this is the last 16th note position.)

To view the previous measure when you are at the beginning of the line, move the cursor to the left margin portion of the menu area and press the left arrow key again. The previous measure is scrolled on to the screen and the cursor remains in the menu area.

You can also use <TAB> to move to the menu area and enter an earlier measure number. Or you can play the sequence and stop at the measure wanted.

### CHANGING DISPLAY PARAMETERS

The accuracy of the notation displayed depends on how closely the default menu settings match the sequence.

In order to display notation correctly, different sequences require different display parameters. These parameters are changed following the general instructions and using the music notation display menu.



## General Instructions

The instruction area contains the instructions for moving around the screen, setting menu values, and operating the memory recorder.

NOTE: These instructions are replaced by the editing instructions whenever you move the cursor into the notation area. They reappear whenever you move the cursor back into the menu area.

## Removing and Displaying Instructions

You remove the instructions from the screen using <CTRL-X>. Displaying four or more staves automatically removes the instructions. Typing <CTRL-X> again restores the instructions to the screen.

## Moving the cursor between Menu Area and Notation Area

You move the cursor from the menu area to the notation area and back using the arrow keys or <TAB>. When using <TAB>, the computer remembers the last position of the cursor in either area and returns it to that position.

## Toggling Values

The <SPACEBAR> is used to toggle values in the left margin section of the menu area (except for track). You may also enter values directly from the terminal keyboard.

## Controlling the Memory Recorder

The memory recorder is controlled from the terminal using the following commands, which move the song position pointer.

COMMAND	RECORDER FUNCTION
<CTRL-P>	Start
<CTRL-E>	Stop
<CTRL-C>	Continue
<CTRL-R>	Rewind
<CTRL-F>	Fast Forward

### Changing Items on the Menu

The menu cursor is the rectangle enclosing the value after "Staves:" in the upper left of the menu area. Use the arrow keys to move it from item to item.

Values within the cursor rectangle are changed by toggling them with the <SPACEBAR> or by entering them directly. Certain menu items do not respond to the <SPACEBAR>.

Any change takes effect when the cursor is moved or when <RETURN> is pressed.

### The Upper Menu Area

The upper menu area deals with overall parameters and current note values.

### Staves

This value sets the number of staves to be displayed in the notation area. Up to three staves can be shown with the instruction area in view.

When four or more (up to eight) are displayed, the instructions disappear. You can always toggle them back with <CTRL-X> if you need to see them. While the instructions are displayed, the staves are compressed to make room.

### Measures

The number of measures to be shown on each staff in the notation area is set with this value. Larger values here display notes closer together. Choose a setting which is useful to your application.

### Measure#

The number entered here selects the beginning measure of the display. You can move directly to any measure in the piece by setting this number. Each time the cursor is moved to another measure, this value is automatically changed to show the number of the measure where the cursor is located.

Moving the music notation display to another measure does not change the position of the song position pointer. If you press CONTINUE, the sequence still starts at the point at which it was last stopped and the display is relocated to the new song position pointer location.

### StrtClick

Use this item to set the exact click or beat where you want the notation to begin.

### TimeSig

Type in the appropriate time signature for the portion of the sequence being displayed.

### Click

This item defines the meaning of a click. Indicate the note value that receives one click by a time value fraction such as:

1/2	half note
1/4	quarter note
1/8	eighth note
3/8	dotted eighth note

### Pitch

The value shown in this area defines in SCRIPT the pitch of the last note entered. Any other pitch may be entered by typing in the letter name and octave number. Changes affect only the next note entered with the <SPACEBAR>.

### Duration

This item shows the duration of the last note entered. It can be changed by typing in a new value. Changes affect only the next note entered with the <SPACEBAR>.

## The Left Menu Area

The left menu area deals with parameters particular to individual staves.

### Trk (track)

Select the track to be displayed on the staff.

### Key

Type in the correct key signature or step through the cycle of fifths with the <SPACEBAR>. Only major key signatures can be used. Enter the relative major for minor keys.

### Accidental Format

When the cursor is moved to the right of the key parameter, you use the <SPACEBAR> to toggle the accidental format between sharps (indicated by [#]) and flats (indicated by [F]). Accidentals are then displayed in the selected format.

### Clf (clef)

Type the correct clef or toggle with the <SPACEBAR>. The available clefs are:

G	treble
A	alto
T	tenor
F	bass
P	full staff with a percussion clef
S	single line with a percussion clef
H	high treble - one octave up



### Res (resolution)

The value entered here determines the smallest note value displayed. The larger the value entered, the higher the resolution and the smaller the note value.

For example, a resolution value of 16 displays the track in 1/16th notes or larger. Any notes whose values are less than 1/16th are still displayed as 1/16th notes. (See the table below.)

RES VALUE	SMALLEST NOTE DISPLAYED
1	whole
2	half
4	quarter
8	eighth
16	sixteenth
32	thirty-second

You may enter any value up to 255 or toggle the most common values with <SPACEBAR>. (See the discussion on "Adding or Editing Tuplets" below.)

When adding notes, toggle or type in the resolution value which gives you the smallest note value you expect to add to the track. The cursor moves in increments equal to this time value. The smallest note that can be added is equal to this setting.

When editing a pre-recorded sequence, higher resolution settings can be used to view the actual attacks of the notes. For example, a 16th note that was slightly early or late would not be accurately displayed unless a value of 32 or 64 was entered. The notes displayed appear to be justified to the nearest subdivision defined by the resolution parameter. Actually they are only displayed this way, unless you intentionally justify them using the <J> key.

If notes recorded in the sequence occur in smaller subdivisions than those defined by the resolution setting, they appear as chords. This does not change their positions in the recorded sequence, only on the display.

### EDITING WITH THE NOTATION DISPLAY

You can move to the notation area from the left margin with the right arrow key or from anywhere in the menu area by pressing <TAB>.

When you move to the notation area, the cursor becomes a vertical line with two horizontal lines, or range indicators about an octave apart. Notes added appear in the octave between the range indicators. When the cursor is on a note, crosshairs (four small lines which radiate from the center) mark the note.

If you have set all pertinent menu items before moving to the notation area, your sequence should appear in correct notation.

The timbre of the selected track is shown below the beginning of each staff.

Editing in the notation area alters the sounds in the memory recorder. These changes can be heard immediately by playing the sequence.

When you save your sequence, it retains any additions or corrections made on the Music Notation Display.

## Adding Notes

You add notes from the notation area by following the instructions displayed on the terminal screen. The menu area displays the values of the last note entered.

You can also enter values directly into the menu area. When you move the cursor into the notation area and press the <spacebar>, a note is added at the cursor location having the values displayed in the menu area.

1. Position the cursor where a note is to be added with its range indicators enclosing the correct line or space.
2. If the pitch and duration values in the menu area are correct for the note you wish to add, press the <SPACEBAR>.

or

3. Enter one of the following time values:

VALUE	NOTE
1	Whole
2	Half
4	Quarter
8	Eighth
6	Sixteenth
3	Thirty-second

For a dotted time value enter the number followed by a period. You may not enter double dots.

4. If necessary indicate an accidental\*:

VALUE	ACCIDENTAL
Q	Sharp
S	Natural
Z	Flat

---

\* Notes entered do not follow the key signature; that is, a B in the key of F is automatically a B natural unless you indicate with a Z that it is to be flat.

In future releases, notes added follow the key signature.

5. Press terminal keys A-G to add a single note. Press <SHIFT> A-G to add a note to a chord.

As you add notes, the range indicators center on the last note entered, following the general direction of the note line. Note that the pitch and duration items in the menu area are automatically reset as you add a note.

6. Additional notes with the same time value can be added by pressing only the letter key or an accidental and letter key.

Additional notes with the same pitch and duration can be entered by pressing <SPACEBAR>.

If you add the same note again at the same place, it is "layered" over the first note. To erase the note, you need to delete twice (once for each layered note).

Notes beyond the cursor's movement limits (4 ledger lines above the staff and 2 ledger lines below) may only be added using one of two alternate methods. You either

- enter the pitch of the note directly to the Pitch parameter in the menu area and place the note using the notation cursor and <SPACEBAR>, or
- enter a note at the cursor limit and push it up or down using the "move" keys <P> or <;> (see below).

As you add the last note before the end of a staff, the screen scrolls ahead to display the next measure with the cursor on the first beat.



## Changing Notes

You can use the Music Notation Display to lengthen, shorten, raise, lower, move, delete or justify any note in a sequence.

## Deleting

With the cursor and crosshairs on the note, press <DEL>. If the deleted note is a single note, a rest of equal value takes its place.

As the cursor moves through a passage, it follows the top note of any chords it encounters. You may delete the whole chord by pressing <DEL> repeatedly. The chord is deleted, note by note, from the top of the chord to the bottom.

You may delete notes from a chord selectively by moving the cursor down the chord until the crosshairs are placed over the desired note and pressing <DEL>.

## Moving Notes

Place the cursor on the note and press the appropriate command:

COMMAND	NOTE MOVEMENT
P	Up in pitch
;	Down in pitch
{	Ahead in time
}	Back in time

The first two commands move the note under the cursor up or down one half-step. The last two move it to either side in increments equal to the resolution value.

If you move a note that was recorded slightly out of time, it is justified automatically (placed exactly on the notated beat or subdivision) when moved.

In a series of tied notes, you can only move the first note of the series. The entire series moves.

### Justifying Notes

Notes that are recorded a little out of time can be corrected by moving the cursor to the note and pressing <J>.

Depending on the resolution setting for a displayed track, a note may be notated on a different beat than it actually sounds. Placing the cursor over the note and pressing <J> places the note in the sequence exactly as it appears in the notation.

In a series of tied notes, you can only justify the first note of the series. The entire series moves to the justified location.

### Lengthening Notes

It is important to realize that Synclavier (R) notes are defined only by starting time and duration. Therefore, when you lengthen a note, you increase its duration. If the note then lasts beyond the end of a measure, it is displayed as two notes tied together. It is, in actuality, still only one note. If another note of the same pitch follows the lengthened note, the two will appear to be tied together. Actually, the first note continues to sound as the attack of the second note is heard.

To lengthen a note, move the cursor to that note and press <]>. A value equal to the resolution time value is added to the end of the note.

If a rest follows the note, the rest is reduced by the same amount. If another note of the same pitch follows the note, the two appears to be tied together, as described above. If a note of a different pitch follows, the extended note forms a chord with the following note.

### Shortening Notes

Pressing the <[> key shortens the note under the cursor by a value equal to the resolution time value. Rests are added at the end of the note.\*

---

\* If you attempt to shorten a note to a time value smaller than the resolution setting, the note appear to have the time value determined by the resolution setting, but actually has a duration of zero, and thus does not sound. Future releases will not allow notes to be shortened to values below those determined by the resolution setting.

### Adding or Editing Tuplets

The Resolution item in the menu area can be used to allow accurate entry or editing of irregular note values such as triplets or quintuplets (called tuplets). Although tuplets cannot be displayed in context, they can be displayed and edited by using the proper resolution settings.

Locate the place where a tuplet is wanted and set the resolution to the number of tuplet notes contained in a whole note. This value is

6	for triplet quarter notes,
12	for triplet eighth notes,
10	for quintuplet eighth notes,
20	for quintuplet sixteenth notes.

The formula for calculating tuplet resolution settings is

$$\text{RES}=\text{NX}$$

where N=number of notes in a 1/X note.

When you enter the resolution value for the tuplet, the rest of the notation is disturbed. If the tuplet has already been recorded, it is displayed properly. You can justify any or all the notes of the tuplet. If the tuplet has not been recorded, enter it using any of the methods previously described. Play the portion of the sequence containing the tuplet to verify correct entry.

When you switch back to the regular resolution, the rest of the notation returns to normal, but the tuplet is not shown correctly. The tuplet has, however, been entered accurately and sounds correctly.

### THE RECORDER DISPLAY

The Recorder Display displays the sequence in the memory recorder on the terminal screen in computer music format. This format displays the starting time, pitch and duration of each note. The starting times of the notes can be displayed in seconds, beats or SMPTE time code. You can add or edit notes at the terminal.

#### WARNING

In order that the computer can devote its full attention to playing a sequence correctly, using the Recorder Display should be avoided while performing any critical timing functions.





### VIEWING THE RECORDER DISPLAY

You activate the Recorder Display from the MAIN MENU by moving the cursor to it and pressing <RETURN> or by typing the letter next to it.

When the Recorder Display is activated, Track 1 is displayed automatically in Column 1. The headings of Columns 2 and 3 say

No Track Displayed

Up to three tracks can be displayed simultaneously, with the notes appearing in computer music format.

As the sequence is recorded or played back, an asterisk appears to the left of each note as it sounds. This is the song position pointer.

MEMORY RECORDER COMPARATIVE TRACK DISPLAY									
1. Enter Track numbers from top-most row to display desired Tracks. 2. Press <DELETE> from top-most row to remove track from display. 3. Move cursor with arrow keys, and enter values to change notes. 4. Press <ENTER> to return to the Main Menu.									
Track 1 "Cowbell"			Track 2 "Bass Guitar"			No Track Displayed			
4.860	C3	0.210	4.860	A#2	0.245				
5.130	F3	0.135							
5.415	F3	0.240							
* 5.685	C3	0.240	* 5.445	A2	0.260				
5.955	F3	0.165							
6.250	F3	0.270	6.000	G2	0.215				
6.525	C3	0.265	6.525	F2	0.220				
6.800	F3	0.260							

### Viewing Additional Tracks

1. Move the cursor to the top-most row of Column 2.

The cursor is on the N of the word "No". This is the track select area of Column 2.

2. Enter the number of the track you want displayed and press <RETURN>.

If the track has already been recorded, the name of the track timbre appears directly under the track number. If the track is empty, the name of the keyboard timbre appears as soon as you press RECORD.

3. Press the START button (or the RECORD button if you are recording) on the keyboard button panel.

The sequence begins playing, and the asterisks indicate the notes being played on each track.

### Notation Format

As the sequence plays or is recorded, a noteline for each note recorded on the track appears in the column to which that track is assigned. Each noteline contains three values which define the note in SCRIPT computer music format:\*

### Starting Time

The first entry on the noteline represents the starting time of the note in seconds. This is an absolute time; that is, it represents the length of time from the moment you pressed RECORD at Time Zero to the moment you played the note.

The starting time can be displayed in seconds, beats or SMPTE time code. You toggle the starting time display by pressing the <SPACEBAR>.

### Pitch

The second entry is the pitch name. The pitch of each note is indicated by a standard pitch letter, followed by an accidental, if any, and the octave number. All accidentals are represented as sharps (#). The octave numbers are relative to middle C=C3.

### Duration

The third entry represents the duration of the note.

The duration can be displayed in seconds or beats. You toggle the duration display by pressing the <SPACEBAR>.

---

\*For more information on the computer music format, see the "SCRIPT Reference Manual."

### The Song Position Pointer

Whether you are recording or playing back a sequence, an asterisk appears beside the noteline of each note as it sounds. There is one asterisk for each assigned track, and each moves independently. When the asterisk reaches the noteline at the bottom of the screen, the notelines are replaced by the following set of notelines.

When you press STOP, the display freezes, with the asterisk located at the noteline of the note that was playing when you pressed STOP. At this point, the asterisk location with the largest time value indicates the true position of the song position pointer.

### Moving the Song Position Pointer

When you are viewing the Recorder Display, you may find it useful to control the memory recorder from the terminal with the following control keys. These keys control the movement of the song position pointer:

TERMINAL KEY	KEYBOARD BUTTON
<CTRL>-P	START
<CTRL>-E	STOP
<CTRL>-C	CONTINUE
<CTRL>-R	REWIND
<CTRL>-F	FAST FORWARD

When the end of a recorded track is reached, the asterisk on that track stops on the last recorded note of the track, even though the sequence continues to play. The true position of the song position pointer is the asterisk having the largest starting time value.

NOTE: <CTRL>-S freezes the screen. If you accidentally use it for either START or STOP, press <CTRL>-Q to unfreeze the screen.



### Scrolling the display

You can use the up and down arrow keys to scroll the notelines of any track display. Place the cursor anywhere on the noteline and press the arrow key repeatedly. When the arrow key reaches the top of a notelist, the entire display scrolls down one noteline at a time. When the arrow key reaches the bottom of a notelist, the entire display scrolls up five notelines to allow the next five notelines to appear. This does not change the position of the song position pointer.

## EDITING WITH THE RECORDER DISPLAY

You can create a sequence at the keyboard and edit it note by note at the terminal.

### Changing Notes

To change any note recorded on a track, follow these instructions:

1. Display the notes to be edited as described above.
2. Use the up or down arrow keys to scroll the notelist to the noteline you want to edit.
3. Move the cursor to the value you want to change.
4. Enter a new value.
5. Press <RETURN> or move the cursor.

When you play the sequence you hear the changes.

You can also delete an entire noteline by placing the cursor on the noteline and pressing DELETE.

If you make a change in the starting time of a note, the noteline is relocated on the screen to reflect the change. A significant change may take you to another part of the sequence entirely, and the notelines appearing on the screen when you entered the change is replaced by notelines nearer the starting time entered.

### Adding Notelines

There are two ways to add a noteline. If you type "+", the new noteline is added directly below the noteline next to the cursor. If you type "-", the new noteline is added directly above the noteline next to the cursor. In either case, the new noteline has the same starting time as the line next to the cursor, a pitch value of C1 and a duration value of 0.000. You can change these values as described above.

NOTE: The cursor must be located at a noteline (not a blank space) to add a noteline.

The changes you make on the Recorder Display alter the sounds only in the memory recorder copy of your sequence. To change the sequence stored on disk, you must save the sequence. See "Storing and Naming Sequences" below.

### STEPPING AND STEP-EDITING

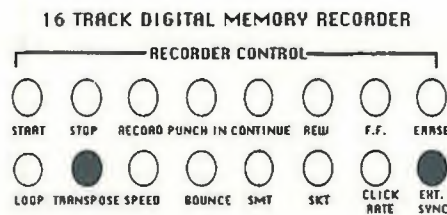
You can use the keyboard triggering feature to play your sequence one beat or even one note at a time for accurate positioning and editing.





### Stepping Through a Sequence

You use the TRANPOSE button along with the EXT. SYNC button (both in the second panel) to activate this feature.



NOTE: This function only works properly when no external signal is connected to the EXT. CLOCK INPUT jack on the computer control panel. Applying a signal to to the EXT. CLOCK INPUT while in this mode can produce unpredictable results.

To place the memory recorder in the Step mode, follow this procedure:

1. Record or recall a sequence.
2. Press the EXT. SYNC button twice so that it is blinking. The MILLISECONDS LED lights and the display window shows

.0

The memory recorder is now ready to accept an external trigger pulse.

3. Press TRANPOSE.

This establishes the step mode. Pressing a key on the keyboard sends a trigger pulse to the external sync input.

4. Press START.

The display window shows

0

The memory recorder does not start since it is waiting for a trigger pulse. If you press START twice the first note of the sequence is ready to play.

5. Press C3 (middle C) on the keyboard to trigger the first step of the sequence. Each time you press middle C again, another step is triggered and the beat number in the display window is incremented.

NOTE: The transpose function is active while you are in this mode. Pressing any key other than C3 transposes the sequence or any soloed tracks in addition to stepping through the sequence. Should this happen, the key may be returned to normal by pressing the C3 key.

While in the keyboard triggering mode you can use F.F. and REWIND to move about your sequence as usual.

### Changing the size of a step

The size of a step is determined by the setting of the click-rate multiplier. You use the BOUNCE button to set this parameter.

To change the click-rate multiplier,

1. Press and hold the BOUNCE button.

The display window shows the current click-rate multiplier setting.

2. Use the control knob to set the click-rate multiplier.

You can set the click-rate multiplier to any value between 1 and 16.

If the click-rate multiplier is set to 1, the size of a step is one beat. Larger multiplier settings yields smaller steps.

CLICK-RATE MULTIPLIER	STEP SIZE
1	one beat
2	1/2 beat
3	1/3 beat
4	1/4 beat
12	1/12 beat
16	1/16 beat

The value of the click-rate multiplier is the number of keystrokes required to step from one click to the next.

### Changing the Speed of a step

The sequence proceeds from one step to the next at the tempo set using the SPEED control setting. You can vary this tempo by pressing the SPEED button and dialing in a new speed setting with the control knob.

You return the SPEED to the default setting of 1.000 by pressing the SPEED button when it is lit.

### Stuck Notes

Notes which are held for periods longer than one step (keystroke) sounds until the step containing the end of the note is reached.

To stop a note from sounding,

Press STOP.

The next note sounds if you press CONTINUE and play a key on the keyboard.



### Step-Editing

The stepping function can be very powerful when used in conjunction with the Music Notation and Recorder Displays.

Using this function, you can listen to corrections immediately after making them, easily stepping backward and forward through the sequence.

### Using the Stepping Function with the Music Notation Display

1. Recall or record a sequence.
2. Press TRANSPOSE, then EXT. SYNC twice.

The TRANSPOSE button lights, the EXT. SYNC button blinks, the MILLISECONDS LED lights, and the display window shows

0

You are now in the step mode.

3. From the Main Menu, select the Music Notation Display.
4. Set the display parameters so that the sequence is displayed properly.
5. Press START on the keyboard control panel, or <CTRL-P> on the terminal keyboard to start the sequence.

The sequence does not start, since it is waiting for a keyboard trigger.

6. Press C3.

The vertical bar in the Music Notation Display, the song position pointer, moves to the right, and any notes recorded within the first step of the sequence plays at the tempo set when the sequence was saved.

Any notes which extend past the end of the step continues to sound until the step containing the end of the note is reached.

To stop a note which is sounding continuously,

Press STOP on the keyboard control panel, or <CTRL-E> on the terminal keyboard.

While using the stepping function remember,

Pressing any other key than C3 (middle C)

TRANSPONES THE SEQUENCE.

### Moving the Song Position Pointer

All terminal commands used to control movement of the song position pointer respond to the stepping function. You may use the following commands:

START	<CTRL-P>
STOP	<CTRL-E>
CONTINUE	<CTRL-C>
REWIND	<CTRL-R>
FAST FORWARD	<CTRL-F>

NOTE: The REWIND or F.F. buttons on the keyboard control panel do not respond to the stepping function. These buttons operate at their normal speeds. Stepping backward or forward in these modes can only be achieved using the terminal commands <CTRL-R> and <CTRL-F>.

### Using the Stepping Function with the Recorder Display

Follow the instructions above, calling the Recorder Display from the Main Menu instead of the Music Notation Display.

In the Recorder Display, the song position pointer is the asterisk next to the notelines.

When the end of a recorded track is reached, the asterisk on that track stops on the last recorded note of the track, even though the sequence continues to play. The true position of the song position pointer is the asterisk having the largest starting time value.

All song position pointer controls are identical to those in the Music Notation Display, and respond to the stepping function in exactly the same way.

While using the stepping function remember,

Pressing any other key than C3 (middle C)

TRANSPoses THE SEQUENCE.

#### SUMMARY OF STEPPING AND STEP-EDITING

1. The step mode is active only when the TRANSPOSE button is lit and the EXT. SYNC button is blinking.
2. Pressing C3 steps the song position pointer through the sequence only when the START, CONTINUE, REWIND, or F.F. buttons are lit.
3. Pressing any note other other than C3 transposes the sequence as it advances to the next step. Pressing C3 returns the track or sequence to the normal key and advances the sequence one step.
4. The tempo of the notes played between steps is set with the SPEED button and the control knob.
5. All Recorder and Music Notation commands which move the song position pointer can be used with the stepping function. The REWIND and F.F. buttons on the keyboard control panel cannot, and respond in the normal way even while the step mode is active.



THE MIDI OPTION



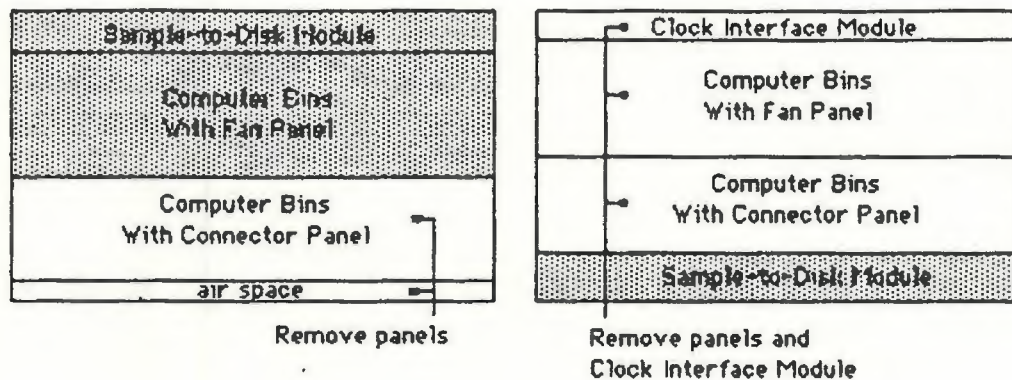
## INSTALLING THE MIDI INTERFACE

To operate the MIDI option, the following minimum hardware configuration is required:

- Two M128K external memory boards;
- a Winchester and a superfloppy disk drive;
- a MIDI unit (either a 1X4 or 2X8 model);
- one or two MI70 boards (depending on the MIDI unit configuration).

If the configuration of your Synclavier (R) does not include all of the above hardware, contact N.E.D. Customer Service to obtain the necessary upgrades.

Your system is contained in one of two computer case models:



If your system is like the left-hand figure with the Sample-to-Disk (R) unit installed in the top bin, you will install your MIDI unit in the air space below the connector panel.

If your system is like the right-hand figure with the Sample-to-Disk (R) unit installed in the bottom bin, you will install your MIDI unit in the top bin. In the latter case, if you have a Clock Interface Module installed in the top bin, you will have to remove the Clock Interface Module and replace it with the MIDI unit.\*

If your system is not configured like either of the above figures, or if you are not sure where to install your MIDI unit, call N.E.D. Customer Service.

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\* The Clock Interface Module can be operated as a stand-alone unit. After removing it from the computer bin, remove its top cover and disconnect the power supply pigtail from the pigtail which goes through the chassis. Connect the pigtail to the socket pigtail. Obtain a standard AC power cable (available from N.E.D.) and connect the Clock Interface module directly to a 120 volt power outlet. For additional information, contact N.E.D. Customer Service.

### The MIDI Module

The MIDI module is available as a four- or eight-output unit. A four-output MIDI (the 1X4 model) has installed inside the unit a single MU70 board with a single flat grey connector cable. An eight-output MIDI (the 2X8 model) contains two MU70 boards with two flat grey connector cables. On the 1X4 MIDI, the first four output plugs on the MIDI front panel are active. On the 2X8 MIDI, all eight output plugs are active.

### Installing the MIDI unit and MI70 Boards

Following are the instructions for upgrading your system with a MIDI unit.

1. Turn off and unplug the Computer Control Unit.

WARNING: To prevent shock hazard and to protect internal circuitry, always unplug the Computer Control Unit before removing any panels.

2. If you are installing the MIDI unit in the top bin, remove the panel (or the Clock Interface Module, if you have one installed there).

If you are installing the MIDI unit in the air space below the bottom bin, remove the panel from that space.

3. Install the MIDI module, making sure the flat grey cable(s) come out through the square opening in the center front bottom of the unit.
4. If you are installing the MIDI unit in the top bin, remove the fan panel.

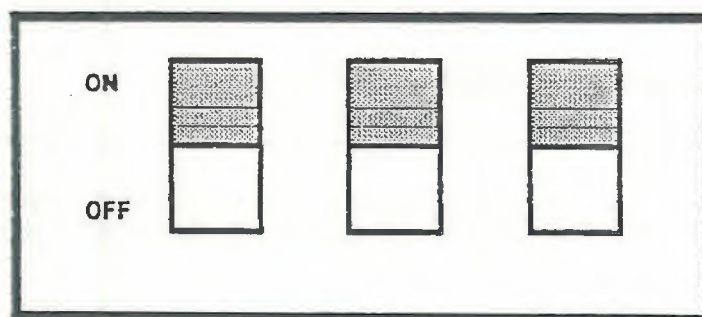
WARNING: Be very careful not to disturb any of the cables behind the panel.

5. Remove the Connector Panel from the bottom bin.

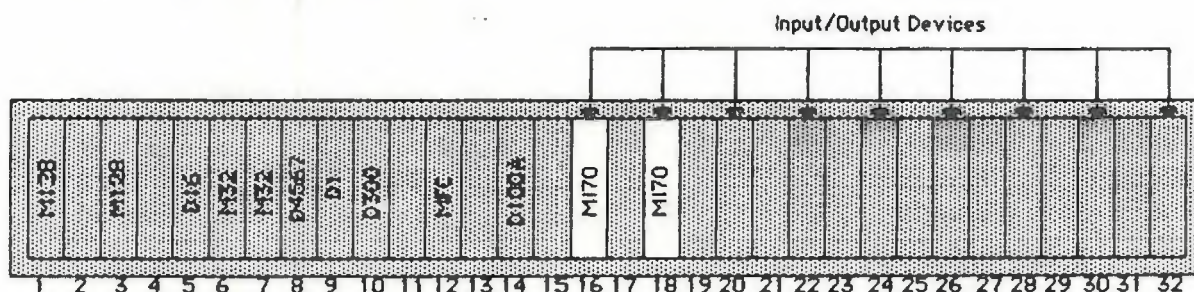
WARNING: Be very careful when you remove the Connector Panel not to disturb the cables behind the panel.



6. Set all the dip switches on one MI70 board to ON.

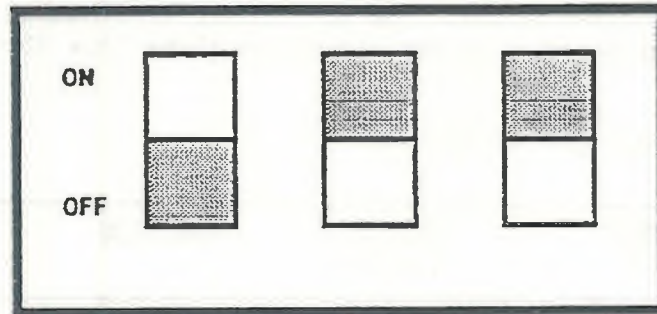


7. Insert the board into the any available even-numbered slot in the Input/Output section of the computer bin.



8. Connect the cable from the left-hand MIDI board to the MI70 board you have just installed in the computer bin. Make sure the blue line on the cable is facing down as you make the connection.

9. If you have the 2X8 MIDI unit, set the DIP switches on the second MI70 board so that the first switch is OFF and the remaining two switches are ON.



10. Insert the second MI70 board into another available even-numbered slot in the Input/Output section of the computer bin.
11. Connect the cable coming from the right-hand MIDI board to the second MI70 board you have just installed. Make sure the blue line on the cable is facing down as you make the connection.
12. After verifying that all connections are secure, carefully replace all the panels.

### Installing Additional MIDI Units

You can install up to four MIDI units giving your system a capacity of up to 32 MIDI outputs. The second, third and fourth MIDI modules are installed as described above. The additional MI70 boards can be installed in the computer bin in any available slots from Slot 16 through Slot 32.

The dip switch settings are as follows:

MI70 BOARD NUMBER	MIDI UNIT NUMBER	SWITCH NUMBER	POSITION
0	1	1	ON
		2	ON
		3	ON
1	1	1	OFF
		2	ON
		3	ON
2	2	1	ON
		2	OFF
		3	ON
3	2	1	OFF
		2	OFF
		3	ON
4	3	1	ON
		2	ON
		3	OFF
5	3	1	OFF
		2	ON
		3	OFF
6	4	1	ON
		2	OFF
		3	OFF
7	4	1	OFF
		2	OFF
		3	OFF

## MIDI ROUTING AND SYNCHRONIZATION ON THE SYNCLAVIER (R) II

When you integrate the Synclavier (R) II into a MIDI network, you will need to assign outgoing signals to MIDI OUT ports and channels. You can designate routings of both the keyboard and the second timbre of a split keyboard as well as all tracks of the memory recorder.

If the Synclavier (R) II is receiving signals from another MIDI unit, the MIDI IN port can be set to receive signals on all or any one of the 16 available channels.

If you are synchronizing the Synclavier (R) II with other MIDI devices, you will need to activate MIDI synchronization.

There are two methods for making MIDI assignments:

- the MIDI button and control knob on the keyboard unit;
- MIDI Display on the terminal.

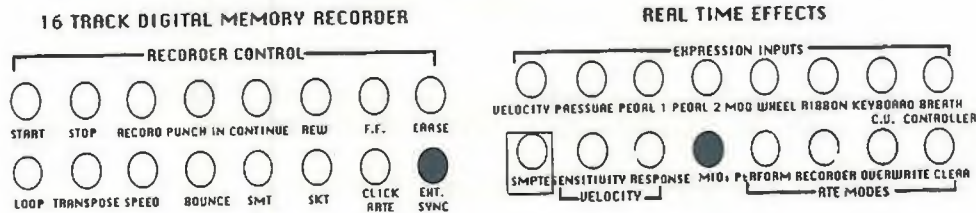
Using the MIDI button and control knob, you can only assign MIDI OUT ports and channels, and incoming synchronization. These procedures are described below.

All settings can be made from the terminal MIDI Display. Instructions on the use of the terminal MIDI Display can be found in the manual "The MIDI Option", written for the Velocity/Pressure Keyboard and included with Release L documentation. There is no difference in operation of the Synclavier (R) II MIDI option; only the contents of the display window are different.



## Using the MIDI Button and Control Knob

The MIDI button is used to assign a MIDI OUT port and channel for the keyboard timbre. It is also used in conjunction with the EXT. SYNC button to set synchronization to MIDI IN.



## Setting a MIDI OUT port for the keyboard timbre

When you first press the MIDI button, you will see in the display window

.00

This means that the MIDI output for the keyboard timbre is turned off. Press the button repeatedly to step through all the possible settings for MIDI OUT ports and channels, or dial a setting with the control knob.

For example, when you press the MIDI button a second time, you will see in the display window

1.01

This setting means that the first channel of the first MIDI OUT port is selected for the keyboard timbre. As you press MIDI repeatedly, you will step through all the possible settings (1.02, 1.03, etc.). If you have one MIDI module installed in your system, the cycle will return to the setting

.00

after the setting

4.16

Once you have assigned the MIDI output and channel for the keyboard timbre, any sequence recorded with that timbre and saved will retain these MIDI assignments.



### Setting MIDI OUT for tracks in the memory recorder

The MIDI button and control knob assign the MIDI OUT port and channel to the keyboard timbre only. To send a sequence from the memory recorder through the MIDI system, you will have to assign a port and channel for each track recorded. You can do this by using the SKT and SMT buttons to bring the timbre of each track to the keyboard as follows:

1. Press SKT and the track number button to bring the timbre of the desired track to the keyboard.
2. Press the MIDI button and make the desired output and channel settings.
3. Press SMT, the track number button and SKT to place the routed timbre back onto its track.

When you save a sequence, you also save the MIDI routings for the keyboard and each memory recorder track in use.

### Setting the MIDI synchronization input

The Synclavier (R) II can be changed from internal synchronization to MIDI input synchronization from the button panel. Setting MIDI out synchronization to a particular MIDI OUT port must be done from the MIDI Display.

To set synchronization to MIDI input:

1. Press EXT. SYNC and hold.
2. Press MIDI to turn the MIDI input synchronization on.
3. Press MIDI again to turn the MIDI input synchronization off.

There is no display in the keyboard display window. However, you can see the change on the MIDI terminal display.

## Real-Time Effects and MIDI

When using the Synclavier (R) II keyboard as the controlling keyboard, you can send all eight expression inputs through the MIDI OUT ports. Similarly, real-time effects performed on other keyboards can be recorded into the Synclavier (R) II memory recorder. Real-time effects changes are controlled in the MIDI network by MIDI Controllers. The following chart shows the MIDI Controllers and their corresponding Synclavier (R) II expression input devices:

CONTROLLER	SYNCLAVIER (R) II EXPRESSION INPUT
Key Velocity	Velocity
Channel Pressure	No direct equivalent although input is recorded in memory recorder
Individual Key Pressure	Pressure
Pitch Wheel	Pitch Wheel
Modulation Wheel	Mod Wheel
Breath Controller	Breath Controller
Modulation Pedal	Pedal2
Sustain Switch	Sustain
Portamento Switch	Portamento

Channel pressure, used by some types of MIDI keyboard devices, is a control signal based on the total pressure of keys pressed on the keyboard at one time. Individual pressure, used on the Synclavier (R) Velocity/Pressure keyboard, for example, is a separate control signal based on the pressure on each individual key.

Although the original Synclavier (R) II can produce neither individual key pressure nor channel pressure signals, it is capable of recording and transmitting both.

If you have recorded a sequence on the Synclavier (R) II from another device that sends out either individual or channel pressure, this information is recorded with the sequence. When these tracks are subsequently used to control the same or similarly equipped devices, setting the PRESSURE item on the MIDI Display to CHAN for those tracks will direct the Synclavier (R) II to send that information.

Additional MIDI controllers will be available in the future.

### NEW KEYBOARD FEATURES AND REAL-TIME EFFECTS

With Release L, several real-time effects previously unavailable on the original Synclavier (R) II keyboard are now made possible by using a MIDI module and another keyboard with expression controls compatible with MIDI. Additionally, real-time effects and certain features on the Synclavier (R) II keyboard have been enhanced.

## KEYBOARD ENVELOPE

With Release L, the Keyboard Envelope feature now allows the use of the control knob to access up to 85 notes. This means that keyboard envelopes can be configured to receive notes from MIDI which are beyond the normal Synclavier (R) keyboard range.

For information on defining a keyboard envelope, see "The Blinking Mode" and "Defining a Keyboard Envelope" in Release H documentation.



## NEW EXPRESSION INPUT DEVICES

When you use real-time effects, you control the dynamics and/or expression of a timbre as you perform, just as you would on an acoustic instrument. With Release L, you have a variety of expression input devices that can be used to change the characteristic sound of a timbre on a note-by-note basis. Each note you play can have a timbre slightly different from the one preceding it and the one following it. When you record a sequence, each nuance of the timbre created with real-time effects is stored in memory.

You can create real-time effects by using

- your keyboard touch,
- one or two foot pedals,
- a mod wheel,
- a pitch bend wheel,
- a ribbon controller,
- a breath controller.

You can also set up the keyboard so that the real-time effects change as you move up or down the keyboard.

Release L software brings you, in addition to the new expression inputs, a new method for "patching" a real-time effect to the timbre parameter you want affected. Instead of being limited to the few timbre parameters formerly available for real-time effects patching, you will now be able to patch almost any timbre parameter to one or more expression input devices.

You will receive a plastic overlay to place over the buttons in the lower half of the third button panel. Following are the buttons you will use to patch each device to particular partial timbre(s) and timbre parameter(s).

NOTE: Once you have installed Release L software, your REAL-TIME EFFECTS buttons will function only as described on the following pages. Previous methods for obtaining real-time effects will no longer work.

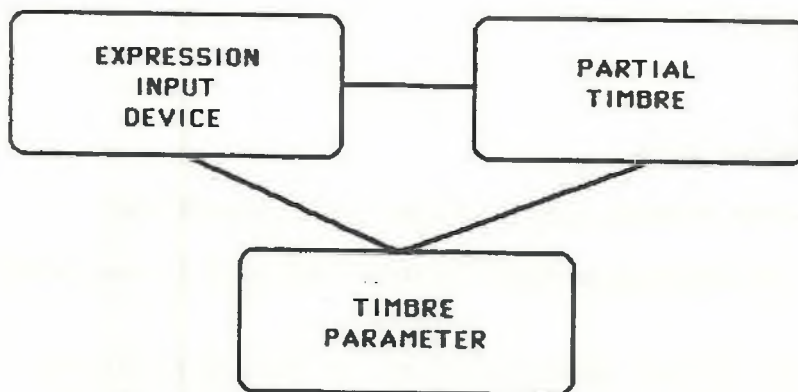


BUTTON	USE	FUNCTION
VELOCITY	Press and hold, then select partial timbre(s) and timbre parameter(s).	Sets up patching of velocity input from MIDI keyboard.
PRESSURE	Press and hold, then select partial timbre(s) and timbre parameter(s).	Sets up patching of pressure input from MIDI keyboard.
PEDAL1	Press and hold, then select partial timbre(s) and timbre parameter(s).	Sets up patching of input to pedal connected to OVERALL VOLUME PEDAL on keyboard back panel.
PEDAL2	Press and hold, then select partial timbre(s) and timbre parameter(s).	Sets up patching of input to pedal connected to REAL-TIME EFFECTS PEDAL on keyboard back panel.
MOD WHEEL	Press and hold, then select partial timbre(s) and timbre parameter(s).	Sets up patching of input of mod wheel on MIDI keyboard.
RIBBON	Press and hold, then select partial timbre(s) and timbre parameter(s).	Sets up patching of input of ribbon controller on MIDI keyboard.
KEYBOARD C.V.	Press and hold, then select partial timbre (s) and timbre parameter(s).	Sets up patching of keyboard control voltage input.
	Press and hold, press two keys	Sets lower and upper limits for range of keyboard control voltage.
BREATH CONTROLLER	Press and hold, then select partial timbre(s) and timbre parameter(s).	Sets up patching of breath controller input on MIDI keyboard.
VELOCITY SENSITIVITY	Press button, turn knob.	Sets the dynamic range for velocity input from MIDI keyboard.
VELOCITY RESPONSE	Press button, turn knob.	Sets the keyboard response for a given velocity sensitivity.

### Real-Time Effects Patching

To use the keyboard for real-time effects, you patch one or more expression input devices, such as velocity or pressure, both to the partial timbre you want to affect and to a timbre parameter, such as partial tuning.

Thus, a three-way patch is set up:



Whenever you press and hold down any one of the expression input device buttons, it will light up and the partial timbre button or buttons to which that device is patched will be lit or blinking.

In addition, all the timbre parameter buttons will be in one of the following states:

- an "on-steady" state, meaning that the expression input is already routed to that parameter in the normal fashion;
- a "blinking" state, meaning that the expression input is routed to that parameter in the inverted mode;
- a "flickering" state (that is, a brief flash once per second) meaning that the parameter is a possible patch.

The timbre parameter buttons that can be patched to an expression input device include

- all buttons under VOLUME ENVELOPE and HARMONIC ENVELOPE;
- PARTIAL TUNING and PARTIAL VOLUME;
- FM RATIO;
- RATE, DEPTH and ATTACK under VIBRATO;
- PORTAMENTO RATE;
- CHORUS;
- ARPEGGIATE/REPEAT RATE.

To set up a real-time effects patch, follow these directions:

1. Press one of the expression input buttons and hold it down while you. . .
2. . . .select the partial timbre you want the real-time effects routed to. The default is "on" for all four partial timbres.
3. Continue to hold down the expression input device button while you. . .
4. . . .select the desired timbre parameter.

You can also set up a real-time effects patch in the "inverted" mode. When you do this, the relationship between the input device and the timbre parameter is reversed. For example, if you patch PED1 to VOLUME ENVELOPE PEAK and SUSTAIN in the normal fashion, then the more you depress the pedal, the louder the sound. If you make the patch in the inverted fashion, then the more you depress the pedal, the softer the sound will be.

To set up a patch in the inverted mode:

1. Press the desired expression input button and hold it down while you. . .
2. . . .select the partial timbre you want the real-time effects routed to.
3. Continue to hold down the expression input button while you. . .
4. . . .press the desired timbre parameter button twice so that it is blinking.

### Removing Real-Time Effects Patches

The CLEAR button is used to remove real-time effects patching from any of the following:

- a particular expression input,
- a particular partial timbre,
- a particular parameter.

To use the CLEAR button, follow this procedure:

1. Press and hold the CLEAR button while you. . .
2. . . .press the button of the expression input, partial timbre, or parameter you want to clear.

To remove all real time effects patching,

1. press and hold the CLEAR button;
2. wipe a finger across all eight expression input buttons. The RTE patchings will be cleared while the routings between partial timbres and timbre parameters will remain unaffected.

To remove real-time effects from all partials,

1. press and hold the CLEAR button;
2. press all four PARTIAL SELECT buttons (one at a time, simultaneously, or in any fashion). All partial timbre patchings will be cleared while routings between expression input devices and timbre parameters will be remain unaffected.







## VELOCITY AND PRESSURE INPUTS

The original Synclavier (R) II keyboard does not have the hardware that makes velocity and pressure sensitivity possible. However, by placing the Synclavier (R) II into a MIDI network with a keyboard that does offer velocity and/or pressure sensitivity, you can create Synclavier (R) performances and sequences with velocity and pressure real-time effects.

The velocity input changes the dynamics or expression on a velocity sensitive keyboard according to how quickly or how slowly each key is depressed. For example, if VELOCITY is patched to VE PEAK and SUSTAIN, the more quickly you play, the louder the notes will sound.

The pressure input changes the dynamics or expression according to how much pressure is applied after the key is all the way down. So if PRESSURE is patched to PARTIAL TUNING, the pitch of the note played will change as you press harder and harder on the key.

Patching the velocity input to a partial timbre affects the attack of a note. Pressure, on the other hand, is an after-touch control. Although any expression input can be patched to any timbre parameter, some patchings make little sense.

For example, you will hear no effect if you patch PRESSURE to VE ATTACK, since by the time you are able to vary the pressure of a key, the attack of the timbre will have already sounded.

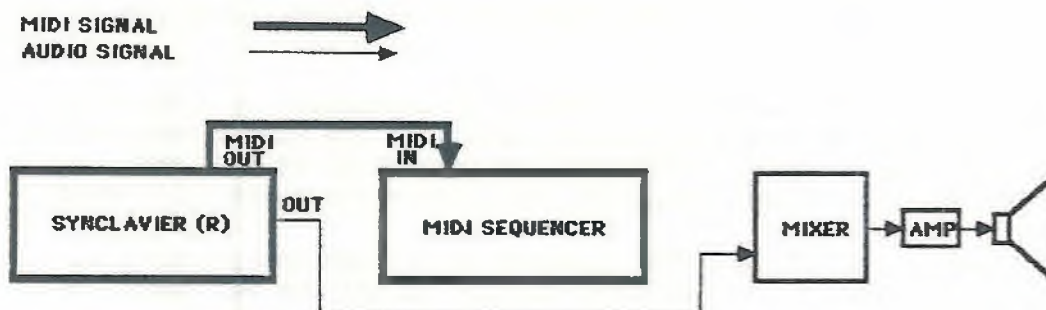
On the other hand, if you patch velocity to PARTIAL TUNING, you will get different pitches each time you press a key but you won't be able to bend the note, since the time to bend a note is after it has begun to sound.

Some real-time effects, such as the attack or a portamento, occur only at the beginning of a note. For these, velocity input is the better choice.

Other effects, such as volume swell or vibrato depth or rate, act throughout a note's duration. For these, pressure input is the better choice.

### Using MIDI to Set Up Velocity and Pressure Sensitivity

Set up the MIDI network with the keyboard with the velocity/pressure sensitivity as the controlling keyboard:



Then follow these instructions:

1. Recall the desired timbre to the Synclavier (R) II keyboard.
2. Set up the velocity or pressure patching as described above.
3. Use the MIDI Display to select a specific MIDI IN channel, if desired.

### Velocity Sensitivity

The VELOCITY SENSITIVITY button can be used to adjust the dynamic range of a velocity-patched timbre. To set the velocity sensitivity of a timbre, follow these instructions:

1. Make sure the keyboard timbre has VELOCITY patched to the desired timbre parameter.
2. Press VELOCITY SENSITIVITY.
3. Turn the control knob to dial in a setting from 0 to 100.

For example, if the keyboard timbre has VELOCITY patched to VE PEAK and SUSTAIN and VELOCITY SENSITIVITY is set to 100 (the default setting), then you will have a full range of volumes available when you play. When your touch is very soft, you will get almost no volume; when you play rapidly, you will get the full volume programmed for the timbre.

On the other hand, if VELOCITY SENSITIVITY is set to 0, you will get the full programmed volume of the timbre no matter how slowly or quickly the keys are played. With a setting of 0, there is simply no dynamic range.

The following table illustrates possible settings with their corresponding dynamic ranges:

SETTING	DYNAMIC RANGE
100	maximum
50	large
25	medium
10	small
0	none

### Pressure Response Filter

When you press PRESSURE for the first time, you will see in the display window

.200

This is the default setting for the Pressure Response Filter, a filter used to smooth out the effects of abrupt pressure changes on the real time effects.

With the control knob, you can dial in settings from .000 to 1.000. A 1.000 setting gives the fastest possible response with any variation in pressure creating an instant change in the timbre parameter patched to PRESSURE. Lower settings give slower responses, making possible very long crescendos or diminuendos or very slow pitch changes. With a setting of .000, you will get no response at all, no matter how hard you press the key.



## THE PEDAL INPUTS

The two pedal input jacks on the back panel of the keyboard unit can now be used for any kind of real-time effects patching.

- The OVERALL VOLUME input becomes PEDAL 1.
- The Real-Time Effects input becomes PEDAL 2.

This means that the pedal attached to the OVERALL VOLUME jack will no longer automatically control volume. However, you may find it convenient to reserve one pedal for overall volume control and the other for other kinds of real-time changes in the partial timbres.

### Volume Control

When the pedal is patched to VE PEAK and SUSTAIN in the normal fashion and is not turned on, no sound will be heard. Nor will there be any sound while the pedal is in the "up" position.

To increase the volume, push the pedal down. Maximum volume is reached when the pedal is pushed all the way down. Volume changes will occur instantly, even in the middle of a note.

You can use the pedal for overall volume changes during keyboard performances or during recording. You cannot use it to affect the playback of a sequence recorded in the memory recorder.

### Other Real-Time Effects

With the first pedal reserved for volume changes, the second pedal can be patched to other real-time effects.

In general, the pedal will be most effective when patched to timbre parameters that occur throughout the duration of a note, such as PARTIAL TUNING (for pitch bending or sliding notes), VIBRATO RATE or DEPTH. Patching the pedal to FM parameters, such as HARMONIC SUSTAIN or FM RATIO, is also effective, as is patching it to REPEAT/ARPEGGIATE RATE.

If the patching is done in the normal fashion, then when the pedal is in the "up" position, all selected real-time effects will be set at 0. As you press the pedal down, the values for the selected RTE parameters will be gradually increased. When the pedal is all the way down, the RTE parameters will equal the time intervals or levels originally dialed in on the timbre parameter.

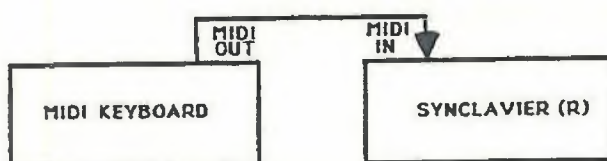




### THE MOD WHEEL, RIBBON CONTROLLER AND BREATH CONTROLLER

Although the original Synclavier (R) II keyboard has no mod wheel, ribbon controller or breath controller input, you can use MIDI and a keyboard that does have these features to achieve real-time effects.

Set up the MIDI network with the MIDI OUT of the controlling keyboard connected to the MIDI IN of the Synclavier (R) II.



Then follow these instructions:

1. Patch MOD WHEEL or RIBBON or BREATH CONTROLLER to the desired timbre parameter.
2. Play the controlling keyboard, using its mod wheel or ribbon controller to change the expression of the Synclavier (R) II.

### Ribbon Controller Filter

The ribbon controller filter operates similarly to the pressure response filter. It is most often used to control the response when you release the ribbon controller.

When you first press RIBBON, the display window will show

.400

This is the default setting for the ribbon controller filter. Dial in a higher setting for a faster response or a lower one for a slower response. The range is from .000 to 1.000.

### KEYBOARD CONTROL VOLTAGE

When the keyboard control voltage device is patched to a timbre parameter, the parameter will change according to where you are playing on the keyboard. There will be less voltage supplied the lower you play on the keyboard and more supplied the higher you play. Thus, the settings of the parameter will approach maximum on the upper range of the keyboard and zero on the lower range.

To use the keyboard control voltage most effectively, left and right keyboard limits should be entered.

The left key limit establishes the key corresponding to 0 volts. Keys to the left of this key will also use 0 for the keyboard control voltage.

The right key limit establishes the key corresponding to maximum voltage. Keys to the right of this key will also use maximum voltage.

To set the left and right keyboard control voltage limits, follow this procedure:

1. Press and hold the KEYBOARD C.V. button.
2. Play two notes on the Synclavier (R) keyboard. The notes can be played simultaneously or one at a time. The lower note will establish the left limit; the higher note will establish the right limit.





## PITCH BENDING

As previously discussed, you can change the pitch of a note by patching PARTIAL TUNING to any expression input device. The devices most effective for pitch bending are the after-touch devices:

PRESSURE  
PEDAL  
MOD WHEEL  
RIBBON CONTROLLER

There are two additional ways to bend a note. You can

- set up a MIDI network and use a pitch bend wheel on the controlling keyboard;
- use the control knob when the SCALE RESET button is lit.

Once you have selected your method for bending notes, you can perform pitch bends on any note in real time. You can record pitch bends but you cannot perform pitch bends on a sequence being played back from the memory recorder. You can record pitch bends after a sequence has been recorded if the keyboard timbre matches the soloed track and the RECORD button is lit.

### Controlling Depth of Pitch Bends

You can increase or decrease the pitch bend range. The maximum pitch bend depth of all pitch bend devices is established by using the SCALE RESET button in the second panel.

When you first press SCALE RESET,

2.00

will appear in the display window. This means that if you perform a pitch bend, the most the note will rise or fall from its original pitch will be two semitones.

To change the maximum depth of a pitch bend to any integer number of semitones, press SCALE RESET repeatedly. The number in the display window will step through the twelve semitones in an octave.

To change the maximum depth of a pitch bend to any fractional number of semitones, press SCALE RESET and hold it down while you dial in a new number. The adjustment can be to within 0.01 semitone.

### The Pitch Bend Wheel

A pitch bend wheel works exactly like the mod wheel, except that no patch need be set up to use it.

### Performing Pitch Bend with the Control Knob

The control knob can also be used to perform pitch bends provided the SCALE RESET button is lit.

Turning the knob to the right increases the pitch of the notes being played; turning it to the left lowers the pitch. Turning the knob all the way to the right or the left will raise or lower the pitch the maximum pitch bend depth.

When you press any other button on the Synclavier (R) II control panel that affects timbre control (such as any button under VOLUME ENVELOPE or HARMONIC ENVELOPE), the control knob will be returned to its function of setting parameters.



EXTERNAL SYNCHRONIZATION ENHANCEMENTS





### EXTERNAL SYNCHRONIZATION ENHANCEMENTS

With Release L, EXTERNAL CLICK, EXTERNAL REPEAT, and EXTERNAL RETRIGGER modes have been added to the external synchronization modes.

- EXTERNAL CLICK

While in this mode, pulses received through the EXTERNAL CLOCK IN jack control Synclavier (R) click pulses. Notes recorded while in the justify mode (BOUNCE button blinking) will be justified to the external clicks.

- EXTERNAL REPEAT

While in this mode, pulses received through the EXTERNAL CLOCK IN jack control the Repeat/Arpeggiate Rate.

- EXTERNAL RETRIGGER

While in this mode, pulses received through the EXTERNAL CLOCK IN jack retrigger the most recently played keyboard note or chord. This simple concept allows recording of external click tracks into the memory recorder as well as greatly simplifying the procedure for drum replacement.

In addition, SMPTE time code and MIDI sync have been added to the available time bases for external synchronization.

An updated version of External Synchronization Including SMPTE is included in Release L documentation. Instructions on the operation of SMPTE from the original keyboard are included below.



## Activating SMPTE

See the manual "External Synchronization Including SMPTE" for information on required hardware and general SMPTE operation.

To activate SMPTE,

1. Press and hold the SMPTE button. If you have installed the plastic overlay on the third button panel, the SMPTE button is labeled. It is the button in the lower left corner of the panel.

The display window shows

OFF

This indicates that the SMPTE mode is off.

2. Continue to hold the SMPTE button while you press the EXT. SYNC button.

If you do not have the SMPTE option installed in the system, the display window shows

Err 29

Otherwise the EXT. SYNC and SMPTE buttons light and the display window shows

30dF

SMPTE is now active in the Drop-frame mode. Pressing the EXT. SYNC button will step you through the four SMPTE modes:

SMPTE MODE	DISPLAY WINDOW SHOWS
Drop-Frame	30dF
Non-Drop	30
25 Frame	25
24 Frame	24

### Setting a SMPTE Starting Time

When you first press and release the SMPTE button, it displays the SMPTE mode. If you press and hold the button, the minutes:seconds portion of the SMPTE starting time is displayed. When the button is released, the frames.bits portion of the time code is displayed. Hours are not shown in the display window. You can view the starting and current SMPTE times using the Recorder Display. Once the times are set, return to the Main Menu to maintain timing accuracy. (See "The Recorder Display" in this manual.)

To change the starting time,

1. Press the SMPTE button until it is unlit.

The display window indicates the current SMPTE mode.

2. Press and hold the SMPTE button while you . . .
3. . . use the control knob to set the minutes:seconds portion of the starting time.
4. Release the SMPTE button.

The display window indicates the frames.bits portion of the SMPTE starting time.

5. Use the control knob to set the frames.bits portion of the SMPTE starting time.

If you are viewing the Recorder Display, it reflects new starting time settings. If you increased the minutes:seconds portion of the starting time beyond 59:59, the Recorder Display contains an entry in the hours column.



USING SAMPLING AND SYNTHESIS



## SOUND FILE TIMBRES

Sampled sounds can be recalled from disk using the Sound File Directory on the terminal display. As a sound file is recalled to the keyboard, it is automatically placed on Partial Timbre 1 (or whichever partial timbre has been selected using the PARTIAL TIMBRE SELECT buttons on the keyboard control panel).

Since it is now a partial timbre, the sound file can be modified in many of the same ways a synthesized partial timbre is modified, using the buttons and control knob on the Synclavier (R) keyboard control panel. There are some limits to the kinds of changes you can make on a sound file partial timbre which you will learn in the section "Modifying a Sound File."

You can place other synthesized or sampled sounds on the three remaining partial timbres and store the combination timbre in a timbre file.

When you play the timbre, the sampled sound will come out the ADX/DAX Conversion Unit and the synthesized sounds out of the output jacks on the computer.

A sound file timbre can be given a timbre name and stored in a timbre file.

### Recalling Sound Files

When you use the Sound File Directory to recall a sound file to the keyboard, the computer searches first in the current catalog and then through all other catalogs in the system.

If the sound file cannot be located in the current or top-level catalog,

Error: Missing Sound File [Name]

will appear at the bottom of the terminal screen. If the Beep Status has been set to ON, the terminal will emit a beep.

### Modifying a Sound File

Once a sound file has been recalled to the keyboard, it becomes a partial timbre. As such, it can be modified in many ways. Because the waveform of a sound file is set, no harmonic adjustments can be made, such as changing relative volume of any of the harmonics or adding new harmonics or frequency modulation.

The following modifications, however, can be easily made using the appropriate buttons on the keyboard unit control panel and the control knob:

- Within limits, the volume envelope can be adjusted using the six VOLUME ENVELOPE buttons and the DECAY ADJUST button. The volume envelope must follow the volume limits of the original sound file. That is, a partial timbre can be made softer than the original sample at any given moment but not louder.
- Vibrato and portamento can be added using the five VIBRATO and the three PORTAMENTO buttons.
- Amplitude modulation can be added using the VIBRATO WAVE, RATE and DEPTH buttons.
- The partial timbre can be tuned using the PARTIAL TUNING button.
- Stereo definitions can be added using the blinking mode and the stereo assignment buttons. (See Release H.)



### Creating a Whole Timbre

Once the sound file partial timbre has been modified, it can be combined with up to three other partial timbres. These can be synthesized sounds or other sound files. If sound files are placed on any of the other partial timbres, care must be taken that there is no overlapping of sound files on a single key.

You can place the sound you want on the other partial timbres in any of the following ways:

- Recall a partial timbre from another timbre in the current timbre bank:
  1. Hold a PARTIAL TIMBRE SELECT button while you. . .
  2. . . .press a numbered button under TIMBRE ENTRY.
- Recall a partial timbre from a timbre recorded on a track in the memory recorder:
  1. Hold a PARTIAL TIMBRE SELECT button while you. . .
  2. . . .press first SKT and then a track number button under TRACKS.
- Recall a sound file:
  1. Select the partial timbre.
  2. Press CTRL-C to bring up the Sound File Directory.
  3. Select the desired sound file (it will be automatically be placed on the selected partial timbre).
- Bounce one partial timbre to another:
  1. Press the BOUNCE button.
  2. Select the partial timbre you want to copy from.
  3. Select the partial timbre you want to copy to.
- Create a keyboard patch:
  1. Select another partial timbre.
  2. Assign sound files to different regions of the keyboard as described in "Creating a Keyboard Patch" below.

### Erasing a Partial Timbre

You can erase any partial timbre by bouncing an inactive partial timbre onto the partial timbre you want to erase. If all partial timbres are programmed, recall a partial timbre from a timbre on an empty track in the memory recorder as follows:

1. Hold the button of the partial timbre you want to erase.
2. Press SKT.
3. Press the numbered button of an empty track.

Once you have created the whole timbre, you can

- modify it using the REPEAT and ARPEGGIATE buttons;
- patch in real-time effects using the EXPRESSION INPUT buttons.

As with any timbre, all the above modifications will be saved with the timbre.

### Storing Sound File Timbres

Sound file timbres are stored in timbre banks just like synthesized timbres. You will store them in exactly the same way as any other timbre, using the TIMBRE BANK and TIMBRE ENTRY buttons with the ENTRY WRITE button under TIMBRE STORE/RECALL.

When a timbre containing sound files is stored in a timbre file, the timbre file stores the names of the sound files and all modifications you have made on each partial timbre and on the whole timbre. The actual sound files continue to be stored as individual sound files on your Winchester disk.

When you recall the timbre, the computer will automatically search for the sound file(s) in the current catalog and then the top-level catalog of the Winchester. If a sound file cannot be located, the error message

Error: Missing Sound File [Name]

will appear on the terminal screen. The partial timbre to which the sound file has been assigned will be silent.

### CREATING A KEYBOARD PATCH

As in previous releases, a keyboard patch consists of a group of sound files, each one sounding on a discrete region of the keyboard. With the new software, the keyboard patch is created from the Patch Display on the terminal. Like a single sound file, a patch is automatically assigned to a selected partial timbre.

A keyboard patch can be modified (with the same limitations as a single sound file) and combined with other patches or sound files or synthesized sounds on the three other partial timbres. The whole timbre can be modified, given a timbre name and stored in a timbre file.

Keyboard patches created with earlier software can be used with Release L software. Since the patches, as partial timbres, are now stored in .NEWDATA files along with synthesized timbres, old keyboard patches can be either re-entered from the Patch Display or recalled out of the old .PATDATA files and stored in .NEWDATA files, as outlined in the Appendix.

### Using the Patch Display

You will use the Patch Display to create a keyboard patch of sampled sounds and assign them to a partial timbre.

When the display is first brought up, you will notice across the top a set of commands that you can use directly from this screen without returning to the MAIN MENU.



## Patch Display Commands

### <RETURN>

When you first bring up the Patch Display, the currently selected partial timbre will be Partial Timbre #1 of the keyboard timbre. This can be either a synthesized timbre or a sound file, depending on what you have just been doing. Pressing <RETURN> at this point erases any synthesized partial timbre contained in the currently selected partial timbre and sets the Display for entering a keyboard patch.

Once you have created the first sound file patch, you can press <RETURN> and the Keyboard Display will replace the Patch Display. The Keyboard Display lists all the keys on the keyboard with the name of the sound file, if any, assigned to each.

### <CTRL-C>

When you are creating a patch list and you press <CTRL-C>, a directory of sound files in the current catalog replaces the Patch Display. You select a sound file in the same way as with the previously described sound file directory. With this directory, however, the sound files will be recalled to the current line of the keyboard patch. When you return to the Patch Display, you will see the sound file name as the File Name entry.

### <CTRL-E>

When you press CTRL-E, the previously described directory of devices and subcatalogs available from the current catalog will replace the Patch Display. You enter the desired subcatalog or device in the same way as described in the section "Real-Time Terminal Displays."

### <?>

A special screen with instructions for creating a keyboard patch can be accessed from the Patch Display by typing ?.

## Creating a Patch

The first step in creating a keyboard patch is to select the partial timbre onto which it will be placed. When you first bring up the Patch Display, you see

Partial #1 is empty.

Press <RETURN> to erase this partial and create a Patch list for Partial #1 —

If the partial timbre with which you are working already contains a synthesized sound you see

Partial #1 contains an FM or synthesized sound.

Press <RETURN> to erase this partial and create a Patch list for Partial #1 —

If you want to create a patch on a partial timbre other than Partial Timbre #1, press the space bar to step through the remaining three partial timbres or select one using the PARTIAL TIMBRE SELECT buttons on the keyboard. The partial timbre will change both on the Patch Display and in the display window on the keyboard control panel.

When you press <RETURN>, column headings will appear. Type in the appropriate information, as indicated below.

### SOUND FILE "PATCH" DISPLAY

1. Use this screen to create Patch Lists. Press ? for more instructions.
2. Move cursor using arrow keys. Enter new values.
3. Select Partial Timbre from button panel or by pressing space bar.
4. Press <CTRL-C> to view directory of Sound Files in Current Catalog.  
    <CTRL-E> to enter a different Subcatalog.  
    <RETURN> to view Keyboard Display.  
    <ENTER> when done with this screen.

Keyboard Timbre: 1-1-1:

Current Catalog: WO

Partial # 1:	Buffer Size:	82 Sectors	Total Memory:	172 Sectors			
File Name	Start	End	Volume	Transpose	Tuning	Total Length	Loop Length
1. SNARE	C3	D3	100.0	C3	0.00	0.000 000	0.000 000
2. KICK	E3	F3	100.0	D3	0.00	0.000 000	0.000 000
3. TOM	03	A3	100.0	03	0.00	0.000 000	0.000 000

## The Patch List

### File Name

The File Name may be the name of any sound file in the current subcatalog. If you want to see a list of those sound files, press CTRL-C. If you recall a sound file from this directory, it will be placed automatically onto the assignment line where the cursor is located.

If the sound file you want is not in the current catalog, press CTRL-E to bring up the directory of subcatalogs available from the current catalog and then enter one of those catalogs by selecting it with the cursor and pressing RETURN or by typing in its treename.

### Start and End

The Start and End columns define the region on the keyboard to which the specified sound file will be assigned. The Starting Key is the lowest key in the region, the Ending Key is the highest key.

Key names are those used in the SCRIPT language with a pitch letter followed by an octave number, from C1 for the lowest C on the keyboard to C6 for the highest C. You may enter a key name which includes a sharp (#) or a flat (F). However, the program will reprint a key name entered with a flat as its equivalent in sharps.

The keyboard region of a sound file may not overlap the keyboard region of any other sound file in the patch. If you do assign two different sound files to the same key, the message

Error: Sound Files Overlap

will appear on the terminal screen.

If you assign a sound file to a region of the keyboard that would require a playback sampling rate of greater than 50 kHz, the message

Error: Sampling Rate Out of Range

will appear on the terminal screen. This latter error would occur, for example, if you assigned a sound file that had been sampled at the pitch A3 to C4, the C above middle C. (See the "Musician's Guide to Sample-to-Disk.")



## Volume

The Volume is used to adjust the relative volume of the sound file. A percentage between 0.0 and 100.0 may be specified.

## Transpose

The original pitch of the sound file determines the pitch of the region to which the sound file is assigned. You can transpose the region by typing in a pitch name in this column that is different from the original pitch.

## Tuning

You can adjust the actual pitch of the sound file by typing in any value between -48.00 and +48.00 in the Tuning column. You may want to make fine tune adjustments by ear.

1. position the cursor in the Tuning column of the sound file you want to tune;
2. hold down a key on the keyboard unit;
3. turn the control knob.

As you turn the control knob, you will hear the sound file change in pitch. You will also see the values change in the display window as well as in the Tuning column at the terminal.

When you have made the desired assignment for the first sound file, move the cursor down one line and assign the next sound file to a keyboard region.

At any time, you can press RETURN to view a display of the entire keyboard that lists each key on the keyboard followed by the sound file name that is assigned to it.

KEYBOARD DISPLAY							
1. Select Partial Timbre from button panel or by typing 1,2,3, or 4.							
2. Press <RETURN> to return to Sound File Assignment Screen.							
3. Press <ENTER> to return to Main Menu.							
Timbre: 1-1-1: "SINE WAVE"				Selected Partial: #1			
OCTAVE							
PITCH	<u>C0 - B0</u>	<u>C1 - B1</u>	<u>C2 - B2</u>	<u>C3 - B3</u>	<u>C4 - B4</u>	<u>C5 - B5</u>	<u>C6 - B6</u>
C				SNARE			
C#				SNARE			
D				SNARE			
D#							
E				KICK			
F				KICK			
F#							
G				TOM			
G#				TOM			
A				TOM			
A#							
B							

### Attack Buffers

Attack buffers are used to store the beginning of each sound file assigned to a keyboard patch. When you press a key, the sample from the attack buffer sounds while the computer searches for the sound file on the Winchester disk. By the time the sample in the attack buffer is finished, the sound file will have been located and the rest of it can be read from the disk.

With each new sound file added to the patch, a new attack buffer is added and the memory assigned to the buffers is automatically reallocated so that each buffer has an equal amount of memory.

As you add new sound files to the patch, you will notice that the values after "Buffer Size" and "Memory Left" change with each additional sound file. The more sound files are added, the shorter each buffer will be. Samples stored in very short buffers may finish before the computer locates the sound file. An audible click or dropout will be heard. When this happens, the error message

#### Input/Output Error

appears on the terminal screen and the terminal will beep (provided that the Beep Option is ON).

The ORK-IMB version of the Real-Time Performance software allocates more memory to attack buffers than any of the other versions. You may want to set your RTP to this version when creating keyboard patches. See "RTP Versions" in the "Software Installation Procedure" section of this manual.



### Modifying the Keyboard Patch

A keyboard patch is a partial timbre and thus can be modified in the same way as a sound file partial timbre is modified and with the same limitations. All the sound files in the patch will be affected by any modifications. That is, if you dial in a vibrato setting for the partial timbre, each sound file in the patch will have that setting.

### Creating a Whole Timbre

The keyboard patch partial timbre can be combined with up to three other partial timbres. These can be other keyboard patches or synthesized sounds. If two keyboard patches are on two different partial timbres, care must be taken that the sound files on each do not overlap.

The same whole timbre modifications made for sound file timbres can be made for timbres with keyboard patches.

### Storing Keyboard Patches

When you store a timbre with a keyboard patch in a timbre file, the timbre file contains the names of all the sound files in the patch list, all the other information on the Patch Display (starting and ending note, new pitch, etc.), plus all the timbre modifications.

When you recall a timbre with a keyboard patch, the computer will search for each sound file assigned in the current or top-level catalog and place the attack of each in the attack buffers. If any sound file cannot be located, the message

Error: Missing Sound File [Name]

will appear on the terminal screen. The keys to which any missing sound file is assigned will be silent.

You can activate the Missing Sound File display from the MAIN MENU to see a list of the missing sound files. Then you will have to press <BREAK> to return to the Monitor and use the FORMCOPY utility to load the sound files onto the Winchester.

If the sound files that are contained in a keyboard patch are not in the top-level catalog, it is a good idea to store them together in the same subcatalog so they can be easily accessed when you recall the sequence.

### Keyboard Patch Summary

1. Select the Patch Display from the MAIN MENU.
2. Select a partial timbre if you want the patch on a partial timbre other than Partial Timbre #1.
3. Press <RETURN> to bring up the column headings.
4. Type in the sound file name, the starting and ending key, the relative volume, the new pitch and semitone correction values for each sound file in the patch.
5. Press <RETURN> to view sound file keyboard assignments and make any changes.
6. Make any modifications using the control knob and the appropriate buttons on the keyboard control panel.
7. Select the other partial timbres and either create patches or recall other partial timbres or sound files to them.
8. Make any desired whole timbre modifications.
9. Give the new timbre a name.
10. Store it in a timbre file.
11. If the sound files for the patch are not in the top-level catalog of the Winchester, you may want to store them in the same subcatalog as the timbre file.





## REAL-TIME PERFORMANCE

Real-time performance with a sound file timbre is the same as with a synthesized timbre except that only one sound file will sound at a time.

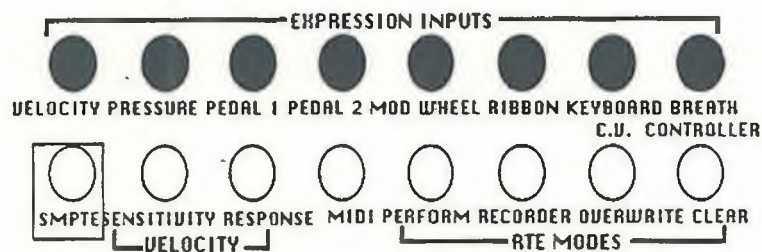
The keyboard control functions operate the same for both kinds of timbres:

- The keyboard tuning buttons (TUNING BASE and OCTAVE RATIO in the third panel and the SCALE ADJUST in the first panel) can be used to tune the entire keyboard.
- The keyboard can be split using the SKT button with the TIMBRE BANK and ENTRY buttons or the numbered buttons under TRACKS.

When you split the keyboard, the partial timbre with the sound file or keyboard patch must remain within the playable range of the sound file(s).

Real-time effects can be patched in using the EXPRESSION INPUT buttons.

### REAL TIME EFFECTS



### Sound File Output

If the keyboard timbre contains both a sound file or keyboard patch and synthesized partial timbres, the output from the sampled sound(s) will be from the MIXED output jack on the ADX/DAX Conversion Unit and the output from the synthesized sounds will be from the output jacks.

As with earlier releases, you can use the GATE and TRIGGER outputs and the keyboard control voltages to control external devices, such as envelope control filters and other studio effects units.



### RECORDING AND PLAYING BACK SOUND FILE TIMBRES

You record a Synclavier (R) sequence using timbres with sound files exactly as you would record using a timbre with synthesized sounds only. Each time you press RECORD, the notes you record will be overdubbed onto any track containing exactly the same timbre as the keyboard timbre, unless you specify otherwise. If no track contains the same timbre as the keyboard timbre, the first empty track will be selected.

During playback, the memory recorder will automatically select the correct sound file to play each recorded note, just as it does during real-time performance. If several tracks contain sound files and/or keyboard patches, you will hear only one when recording or on playback.

You may want to create your sequence using synthesized sounds only. When you are satisfied with the actual notes on each track, you can then substitute the timbres with keyboard patches or sound files.

All the memory recorder buttons can be used to modify sequences recorded with sound files. You can

- change the speed of a sequence using the SPEED button;
- transpose a sequence using the TRANSPOSE button;
- insert loops using the CONTINUE and LOOP buttons;
- change patches for a recorded sequence using the SMT and SKT buttons;
- record in the justified mode using the BOUNCE button.

### Recording Synclavier (R) Sequences Onto Tape

Since the output of sampled sounds is monophonic and only one sound can be played back at a time, sequences that have several tracks using timbres with sampled sounds will need to be transferred to tape for complete playback.

This can be done effectively by using the Overlay Output Mode along with the External Synchronization function of the Synclavier (R).

Before using Overlay Output Mode, you should be familiar with the external synchronization function of the Synclavier (R). Information on the external synchronization function plus instructions for common applications are in the manual "External Synchronization including SMPTE".

Following is a brief summary of the procedure for using external synchronization.



### External Synchronization

When the EXT. SYNC button in the second panel is either lit or blinking, the sequence in the memory recorder will wait for an external signal to trigger it. The external signal can be a signal recorded from the Synclavier (R) onto an empty tape track or a signal from a digital metronome or other digital pulse triggering device.

The basic procedure for spinning off tracks to a multi-track tape recorder is as follows:

1. Place the Synclavier (R) in one of the two external synchronization modes by pressing EXT. SYNC once or twice.
2. Record the external sync signal onto an empty tape track through the EXT. CLOCK OUTPUT jack on the computer panel.\*
3. Rewind the tape.
4. Patch the recorded external sync signal into EXT. CLOCK INPUT jack on the computer back panel.
5. Record each Synclavier track onto the tape one at a time. The click track can be recorded on tape this way as well.

The sync delay feature should be used for greatest rhythmic accuracy. When using sync delay, the Synclavier (R) will wait the specified number of milliseconds after receiving the external signal before advancing the memory recorder.

When you press EXT. SYNC, the current sync delay will be displayed in the display window. You can dial in any sync delay from 0.0 to 75.0 milliseconds.

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\* A pulse conditioner, such as the Clock Interface Module (CIM-1), is recommended for recording Synclavier (R) signals to tape.

### Overlay Output Mode

You select the Overlay Output mode from the MAIN MENU by moving the cursor over the OFF following it and pressing RETURN to change the OFF to ON.

Overlay playback is done in a series of synchronized passes onto tape. In each pass, a monophonic line of notes is extracted, played and simultaneously erased from the sequence. These passes are continued until all the notes in the sequence have been transferred onto tape and the memory recorder is "empty".

Each output pass will consist of a monophonic line extracted from the sequence. The notes selected will be a set of notes which do not overlap at all, so that each note can be played completely from beginning to end. As a note is played, it is then removed from the memory recorder.

The following general suggestions may be helpful when using the Overlay Output mode:

- Save the complete sequence on disk before beginning Overlay Output.
- Use the nonerasing bounce feature to duplicate each track onto another for convenient use in case of any mistakes.
- Transfer each pass onto a separate track of the multi-track recorder, and mix the results down after all the passes have been successfully completed.

To record a track or tracks of the memory recorder onto tape using the Overlay Output mode, perform the following procedure for each pass:

1. Lay down the external synchronization signal on one track of the tape recorder and rewind the tape.
2. Select the track or tracks of the memory recorder that you wish to record onto tape. You can select all of the tracks, or you may record each track individually so that special equalization may be used for each one.
3. Press EXT. SYNC and START on the Synclavier (R) control panel.
4. Start the tape recorder when you are ready.
5. At the end of the piece, press STOP on the Synclavier (R) and stop the tape recorder. You will see in the display window the number of notes left on the selected Synclavier (R) track or tracks.
6. Rewind the tape, select a new tape track, and go back to step 2.
7. Continue the process until the display window says there are 0 notes left.

In cases where the duration of notes have been altered using the decay adjust function, which note will be played and which will not is unpredictable. This will affect the intermediary pass only. When the tape tracks are mixed down, the sequence should contain all notes precisely as recorded.



## Storing and Recalling Sequences

If you store a sequence when you are in a subcatalog, the sequence will be stored in the subcatalog sequence file if there is one. If there is no sequence file in the subcatalog corresponding to the button under which you are storing the sequence, the sequence will automatically be stored in the corresponding sequence file in the top-level catalog.

Sequences recorded with sound files are stored in sequence files the same way as any other sequences. The sequence file contains, in addition to the notes and real-time effects, the names of the sound files and all the timbre information as described above.

When you recall a sequence that has sound files recorded on one or more tracks, the computer will search for them in the current or top-level catalog and place the attack of each in the attack buffers. If a sound file cannot be located, the message

Error: Missing Sound File [Name]

will appear on the terminal display. When the sequence is played back, the track with the missing sound file timbre will be silent.

You can activate the Missing Sound File directory from the MAIN MENU to see a list of the missing sound files. Then you will have to press <BREAK> to return to the Monitor and use the FORMCOPY utility to load the missing sound files onto the Winchester disk.

If the sound files that are recorded on a sequence are not in the top-level catalog, it is a good idea to store them together in the same subcatalog so they can be easily accessed when you recall the sequence.





APPENDIX



## DISPLAY WINDOW ERROR MESSAGES

The following error codes (Err 0 — Err 40) may appear in your keyboard display window:

### Err 0:

### Recorder Out of Notes

You encounter Err 0 when long sequences are bounced onto additional tracks without erasing. The only solution is to erase a track.

### Err 1, Err 2, Err 3:

### Too Many Waveforms

There are 32 waveform memories for storing the harmonic coefficients of partial timbres. These error messages appear when the waveform memories are all in use and you try to change the harmonic coefficients for the keyboard partial timbre (Err 1), recall a different timbre (Err 2), or recall a sequence (Err 3).

### Err 4:

### Data/Sound File is Missing

You are trying to access a nonexistent sequence, or recall a timbre or sequence requiring sound files that are not available. Check the Sequence Directory to locate the sequence or select the Missing Sound File Display to identify the missing files.

### Err 5:

### Sequence too Long for Memory

There is not enough room in the memory recorder for the sequence you are trying to recall. This may happen when you have recalled a sequence created in a system with a greater amount of memory than your system.

### Err 6:

### Sequence too Long to Store

You are trying to write a sequence onto a sequence file that is not large enough. Use a larger sequence file or reduce the size of sequence. You can reduce the sequence size of the sequence by substituting simpler timbres, erasing easily replaced tracks, or eliminating some editing.

Err 7: Timbres Must Match for Record

Keyboard and track timbres must match exactly to record on a track that has already been recorded on.

Err 8: No Free Tracks for Record

You have pressed RECORD, and there are no free tracks and no tracks with timbres matching the keyboard timbre. You must either erase a track or change the timbre on one of the tracks to match the keyboard timbre.

Err 9: Timbres Must Match for Bounce

Timbres must match exactly when you bounce one track to another.

Err 11: Out of Memory

You have tried to recall a timbre when memory is full. Erase any timbres not needed.

Err 12: Not Enough Room to Copy Bank

There is not enough room in memory for the bank of timbres you have called up. Erase any timbres not needed.

Err 13: Timbre Bank Does Not Exist

You have tried to recall or store to a bank of timbres that does not exist. Check your Timbre Directory.

Err 14: Not Enough Memory for Timbre Write

When you store a timbre to a timbre file the whole bank is recalled to computer memory, the new timbre is fitted into it, and the bank is then written to the timbre file.

This message appears when you try to store a timbre and there is not enough room in computer memory to recall the bank of timbres.

Err 15: Bank is Too Long to Store

The bank of timbres you are trying to store will not fit in the .NEWDATA file addressed. Find a timbre file with more space.

Err 16: Software Feature is Not Available

You have entered a system command, such as PF3 for Music Printing, for software that is not on your system.

- Err 17: No Memory Left to Record  
The memory recorder is full. You must erase some notes or a track before additional recording.
- Err 18: Sequence File is Empty  
You have tried to recall a sequence from a sequence file that is empty. Check your Sequence Directory.
- Err 19: Operation Not Allowed With 'PATCH' Timbre  
You cannot change the harmonics or add frequency modulation when working with a sound file partial timbre.
- Err 22, Err 23: Must Press ENTRY, BANK or SEQUENCE  
You have pressed the buttons in the wrong order. Follow the directions carefully.
- Err 27: Error - Nothing Written to Disk  
Something went wrong during the storing procedure. Your sequence or timbre was not stored but remains on the keyboard. Try it again carefully.
- Err 29: SMPTE Option is Not in System  
You have attempted to activate SMPTE when that option is not part of your system.
- Err 30: Loading Halted  
If you press STOP while loading sound files the process will be aborted and this message will appear.
- Err 31: Multi Channel Option Not Available  
You have selected Multichannel Display from the Main Menu when that option is not installed in your system.
- Err 32: D16 Timer is Not in System  
SMPTE requires the D16 Scientific Timer. This message appears if you try to activate SMPTE without it.
- Err 33: D16 Timer is Set at Wrong Rate  
The D16 Scientific Timer is used when generating SMPTE time code. Its rate is set at the factory. If you encounter this error message contact N.E.D.



Err 34: Error Detected in SMPTE Signal

The computer is not getting the kind of SMPTE signal expected. Check source and SMPTE mode setting.

Err 35: Signal Does Not Match SMPTE mode

Set SMPTE mode by pressing EXT SYNC MODE repeatedly.

Err 37: Must have Model C Processor

The model C processor is required when looping sound files from the keyboard.

Err 38: Must Set Lengths Before Search

This message is encountered if you try to initiate an automatic search for loop points without making the necessary length settings.

Err 40: MIDI Option is Not in System

You have attempted to activate MIDI when that option is not part of your system.

## TERMINAL SCREEN ERROR MESSAGES

The following error messages may appear on your terminal screen when using the Real-Time Performance system. They indicate common problems in dealing with sound file assignments and other terminal displays. They do not affect your current file or indicate a problem with your system.

### Cannot Add or Delete a Note Here

You have typed in an add or delete command on the Recorder Display when the cursor is on a blank line.

### Changes Not Allowed

You have typed in a value on the Recorder Display when there is no track selected for the column the cursor is in. Or you may be trying to make a change when the Memory Recorder is in the record mode.

### Device not configured.

You have typed in a treename that contains a device that is not in your system configuration.

### Feature is Not Available

You have recalled a sound file when using an RTP version that does not support Sample-to-Disk (R).

### Format Error in Input "<input string>"

You have typed in the wrong type of data for the value required (letters, for example, instead of numbers for volume).

### Input Not Recognized

You have typed a character that is not a recognized command or value.

### Input/Output Error

The attack buffer has finished playing before the computer was able to read the next sample from the disk. This message may occur when you have a large number of sound files assigned in the keyboard patch.

Go to the Monitor and try clustering all the sound files of the patch onto contiguous sections on the disk. Use the collect mode in the SHUFFLE Utility program.

Missing Sound File "<filename>"

You have typed in a filename of a sound file that is not available in the current catalog.

No Floppy Disk in Drive

You have typed in a treename that contains a floppy drive in which there is no diskette.

No Note to Edit

You have typed in a value on the Recorder Display when the cursor is on a blank line.

Not a Sound File "<filename>"

You have typed in a filename of a file that is not a sound file.

Number is Too Large "<number>"

You have typed in a value that is too large, (the volume of a sound file, for example).

Out of Memory!

You are creating or editing a sequence that is too long for the memory recorder.

Out of Room in Sample Memory

You have created a keyboard patch or a sequence that contains too many sound files for the amount of memory you have and there is no more room in the attack buffers.

Sampling Rate Out of Range

You have pressed a key on the keyboard which, according to the current keyboard region and "New Pitch" value, would require the sound file to be played at a rate greater than 50 kHz.

Sound Files Overlap

The keyboard regions defined for one or more sound files overlap.

Unable to find catalog.

You have typed in a catalog name that is not available in the current catalog.



### Errors Which Indicate a System Problem

These errors, which may appear on your terminal screen, indicate a problem with your system software caused by loading incorrect versions of the Real Time Performance software or by not having all the pieces present.

#### Desired Software Feature is Not Available.

You have entered a system command, such as PF3 for Music Printing, for software that is not on your system.

#### Not Enough Memory to Play with this Software.

This message will appear if you try to use Release L software on a system with less than 60K internal memory.

#### This Software is Incompatible with Your System Software.

This message will appear if you try to use a pre-Release L version of the Real-Time Performance software or call up programs such as one of the pre-Release L utilities with Release L software.

#### Your Resynthesis Timbre is Too Large to Play with This Software.

You have created a resynthesis timbre with the Resynthesis/Analysis software that uses more memory than is available when you move to another module, such as Real-Time Performance.

#### Your Sequence and Synclavier Software Formats are Incompatible.

This error message will appear if you try to play a sequence created with Release L software with any earlier software.

#### Your Sequence is Too Large to Perform This Operation.

You have created a sequence with the RTP software that uses more memory than is available when you move to another module, such as Music Printing.

#### Your Sequence is Too Large to Play with this Software.

This message may appear when you are trying to play a long sequence created with previous software.

Your Synclavier Software is Incompatible with This  
Sequence/Timbre.

This error message will appear if you try to play a timbre  
created with Release L software with any earlier software.





#### ACCESSING KEYBOARD PATCHES CONSTRUCTED WITH EARLIER SOFTWARE

Old keyboard patches stored in .PATDATA files can only be accessed from FLOPPY DRIVE 0. Thus, you will need to copy them from their current location onto a floppy diskette. To do this, follow these instructions:

1. Return to the Monitor by pressing the BREAK key.
2. Call up FORMCOPY and copy your .PATDATA files onto a blank formatted floppy diskette in FLOPPY DRIVE 0.
3. On the Winchester, enter a subcatalog containing an empty .NEWDATA file.
4. Type  
NEW X; PLAY  
to return to the Real-Time Performance system.
5. Press and hold the DRIVE SELECT button while you press first the BANK button, then Button 1. This loads Bank 1 of the old .PATDATA file into memory.
6. Press and hold the ENTRY WRITE button while you press TIMBRE BANK 1. This writes Bank 1 which contains the keyboard patches from the .PATDATA file into Bank 1 of the .NEWDATA file in your current catalog.
7. Repeat Steps 2 and 3 with the other banks in the .PATDATA file.